

THE PROCESS OF LEARNING

SOME PSYCHOLOGICAL ASPECTS OF
LEARNING AND DISCIPLINE IN SCHOOL

By

CONSTANCE BLOOR, M.A.

LECTURER IN EDUCATION AT THE STOCKWELL
TRAINING COLLEGE, AUTHOR OF "TEMPERAMENT,"
"A SURVEY OF PSYCHOLOGICAL THEORIES"

LONDON

KEGAN PAUL, TRENCH, TRUBNER & Co., LTD.

BROADWAY HOUSE: 68-74 CARTER LANE, E.C.

1937

3761 | 59

First Published - - - 1930

Reprinted - - - - 1937

Made and Printed in Great Britain by
PERCY LUND, HUMPHRIES & CO. LTD.
12 Bedford Square, London, W.C.1
and at Bradford

PREFACE

This book is designed to meet the needs of students in Training Colleges. It is the outcome of first-hand experience of the difficulties encountered by students in the subject of educational theory and its application to the problems of the class-room. Educational Psychology is a subject of great interest to students, but there are certain dangers attending its presentation. The student has only a limited amount of time at his disposal, and is therefore restricted in his selection of material and in his range of reading. It is not easy on the one hand to avoid a facile acceptance of superficial theory and on the other to escape confusion in the more intricate branches of the subject. The student must recognize the necessity for a scientific approach to the study and for a critically receptive attitude towards the modifications which modern progress in Psychology is continually suggesting in once accepted beliefs. He must not expect to find a complete unassailable science from which easy deductions can be made. It is the hope of the writer that this book may help the student to find a profitable connection between the theory of the lecture room and the problems of the school class-room. The two headings of Learning and Discipline may form adequate bases upon which the argument may rest. It is not claimed that the

following chapters are in any way a complete statement of the bearing of psychological theory upon educational practice. All that is hoped is that it may help to foster a scientific attitude and to provide a simple background of approach to more authoritative text-books.

A scientific approach does not in any way detract from the recognized emphasis upon the value of individual expression which is the keynote of educational enterprise to-day. The true appreciation of individual contribution can only rest upon a knowledge of those avenues along which individual differences are most likely to develop. By this belief the plan of the accompanying text has been dictated. Common equipment in respect of inherited structure and available tools of action has first been stressed and individual superstructure next explored.

In the last chapter of the book a parallel is drawn between the method of treatment so far followed, and the means whereby contemporary effort is seeking to revise the national system of education. There is evidence to-day of a strong desire to solve the problem of adequate educational provision for the children of the race. The type of school is, ideally, determined by the measure of common equipment which may be expected within certain age limits and within certain broadly defined ranges of general and specific ability. And within the walls of any type of school it is the task of the administrator to ensure that, in curriculum and methods of teaching, provision is made for the realization of individual expression.

I should like to take this opportunity of expressing my gratitude to Dr W. A. Brend and to Professor Cyril Burt for their great kindness in reading the proofs, and for their most helpful suggestions which I have incorporated in the text.

CONSTANCE BLOOR.

May, 1930.

TABLE OF CONTENTS

| | PAGE |
|---|------|
| •Chapter I <i>Introduction</i> - - - - | I |
| The branches of educational theory and their interest and importance for the teacher. | |
| Chapter II <i>Education and Psychology</i> - - | II |
| General Principles of Teaching and the avenues of investigation which they suggest | |
| Maxims of procedure—Interest—Individuality. | |
| The problems of the educator and of the psychologist. | |
| Methods of Study. | |

PART I

THE LEARNING PROCESS

| | |
|--|----|
| Chapter III <i>An Elementary Study of Reactions</i> | 21 |
| Terms. Stimulus and Response—Conditioning—Substitute stimulus and substitute response—Conditioning in education—Questions for the educator—Bodily mechanism of behaviour—Innate endowment — Emotions — Fear — Rage — Love. | |
| Chapter IV <i>The first years of a Child's Life</i> | 34 |
| The vital functions and their psychological importance. Early sense experience—Increasing co-ordination—Talking—Subsequent development. | |

| | PAGE |
|--|------|
| Chapter V <i>The Bodily Mechanism of Behaviour</i> | 46 |
| The sense-organs—Exteroceptors—Proprioceptors—Interoceptors. Response organs—Muscles and glands—Connecting mechanism—Nerve-fibres—Central nervous system—The brain—The vegetative nervous system. | |
| Chapter VI <i>Elements of the Learning Process</i> | 58 |
| <i>Range of Learning</i> —Continuity of development—Animal learning—Thorndike's Laws of Learning—Successful practice—Incentive—Parallels between human and animal learning—Rôle of relationships—Co-ordination of units—Effective units of learning—Arithmetic and geography—Plateaux in learning. | |
| Chapter VII <i>Some further Developments of the Learning Process</i> | 76 |
| Continuity of Forms of Learning—Sense-training—Sense-perception—Generalized pattern reaction. Application to school curriculum and teaching. Methods—School organization—Preperception and apperception. | |
| Chapter VIII <i>Aids to Constructive Work</i> | 93 |
| Recapitulation—Imagery and Imagination—Imagery in children—The value of imagery—Novels of phantasy—Varieties of imagination—Imaginative activities of children—Make-believe. | |
| Chapter IX <i>The Process of Remembering</i> | 110 |
| Influence of past upon present experience—Use of term memory—Memory in learning—Memorizing—Immediate reproduction versus permanent retention—Forgetting and recuperation. Units of memorizing—Intervals of practice. | |

| | PAGE |
|--|------|
| Chapter X <i>Reasoning</i> - - - | 128 |
| Position of reasoning in the scale of activity— Definitions—The Elements of Reasoning—Ex- amples—Reasoning tests—Progress in Material and growing power of generalization—Abstrac- tion—Professor Burt's conclusions—The attitude of the teacher—The experiments of Köhler. | |
| Chapter XI <i>General Intelligence</i> - - - | 145 |
| Introduction—Definitions—Development of in- telligence tests—Examples of intelligence tests —Calculation of mental age—Age limits of de- velopment—Group tests—Performance tests— diagnostic value of Intelligence Tests—Signific- ance of some intelligence quotients. | |
| Chapter XII <i>Tests of Attainments and individual differences in specific abilities</i> - | 161 |
| Standard of attainments—Technique—Tests of Reading and Arithmetic—Backwardness in read- ing—Backwardness in Arithmetic—Conclusion. | |

PART II

CHARACTER AND DISCIPLINE

| | |
|--|-----|
| Chapter XIII <i>Aspects of Discipline</i> - - | 177 |
| Method and discipline—Minor disturbances— Personal relation of teacher and class—Punish- ment—Self-government and free discipline— Psychological basis. | |
| Chapter XIV <i>The Simplest Units of Character</i> | 193 |
| Fundamental emotional reactions—Fear—Anger and its educational significance—Competition —Love. | |

| | PAGE |
|--|------|
| Chapter XV <i>The Organization of Sentiments</i> - | 208 |
| Definitions—Confusion of motives—Sentiments —The self-regarding sentiment—The teacher's task—Suggestion and tone—Complexes. | |
| Chapter XVI <i>The Group at Work and in Play</i> | 221 |
| The "Gregarious Instinct"—The organized group—Group units within the school—Group leaders—The group at play—The value of play —Co-operation in play—Play and work—Play methods in the class-room—Rhythm—Curiosity —Construction and acquisitiveness. | |
| Chapter XVII <i>Individual differences in emotional Equipment</i> - - - | 240 |
| Concept of personality—Basis of individual differ- ences—General emotionality—Temperament— Possible physiological basis—The cautious tem- perament and conception of will—The causes of serious offences—Anger—Self-assertion and sub- mission—Lying—Sex offences | |
| Chapter XVIII <i>Aims and Organization</i> - | 255 |
| Introduction—Nursery schools—The elementary School—Seven to eleven—Psychological fea- tures of adolescence—Change of school at 11— Suggested types of school for post-primary education—Education for leisure—The school and the outside world. | |
| Appendix <i>The Instinct Controversy</i> - - | 270 |
| Outline of different theories—Significance for educator. | |
| Index - - - - - | 281 |

THE PROCESS OF LEARNING

CHAPTER I

INTRODUCTION

To the practical teacher there must often appear a distressing gulf between the handling of children in school and the vast volume of educational theory in the text-books. It is not that he does not find in the text-book, from whatever point of view it may be written, much that is clearly germane to his own purposive activity and even more which he finds interesting and enlightening. The unquestioned interest of the young teacher, and of the student in training, in what is known as educational psychology is in itself apt to lead to confusion. The volume of literature on the theory and practice of teaching is rapidly growing, and turn where he will the young and enthusiastic teacher finds himself easily engrossed in what he reads. But he is apt to be beset by doubts as to how far, or at least how quickly, this much reading is going to lead him, personally, towards the goal of an efficient teacher. And it is pre-eminently important that he shall reach that goal quickly. While it is true that in all professions a moderate degree of proficiency must be attained within a reasonably short period, perhaps in no other profession is

an initial incompetence fraught with such misery to the young beginner as in teaching. He knows that the consequences of inefficiency will recoil with undue severity upon his head.

He therefore feels with justice that he must before everything acquire competence as a craftsman, and that having acquired this he may then feel free to turn his attention to those wider matters of acknowledged interest whether they be psychological, or the history of educational institutions and the growth of educational experiments.

While the student is in training he welcomes, even though he dreads the periods which he spends in practice in the schools, the 'demonstration' lessons which he hears given in connection with the given school subjects and the visits for observation to selected schools. Here is something which bears directly upon the work he is going to take up and from which he feels that, whether or not he belongs to the hypothetical category of the born teacher, he must of necessity derive practical help in his work in the class-room. It represents first-hand experience with the kind of situation to which he must increasingly adapt himself and nothing can take the place of first-hand experience.

Parallel with this directly practical initiation into his work the student also imbibes what is grouped together as the theory of education. In this department are discussed such questions as the aims of education, the relation of school to home, the general lines of child development, the physical welfare of the child, the different types of educational institutions and the like. Here there is a vast bulk of material,

of genuine interest to the student but of varying degree of relative practical and immediate reference to the problems of the class-room. Let us imagine a young and enthusiastic student or young teacher, showing already signs of promise and able to conduct himself in the class-room without disaster. He approaches the study of educational theory with an eager and active mind. He has a receptive attitude, and in proof of his assimilation he tries to interpret the results of his study in terms of his own activity and of the activity of the children in his charge. He is confronted with two difficulties, and as these difficulties are both real and fundamental it is well to face them at the beginning. The first is that the situations of life are so complex that it is difficult to disentangle the factors which contribute to them and to analyze otherwise than superficially the causes and effects at work. It is often claimed that the school represents a comparatively simple and standardized situation, lending itself on this account the more readily to investigation and experiment. This may be so, but it is a comparative simplicity, and infinitely more complicated than the simple situations of, for example, animal learning which are used most frequently as illustrations in psychological text-books. It is because of this complexity that the young teacher so often fails to see the immediate application of principles, acquired through lectures and text-books, to the practical problems of teaching. He must for the most part console himself with the reflection that at least the themes are intrinsically interesting and with the hope that they are enlarging his own attitude towards his work, and that such enlightenment cannot

fail to be reflected in a wider comprehension of his task. Such a consolation is well justified, but something more is required. It is the hope of the writer that this book may help the young student to find more readily the connection of theory with the guidance of children in the school.

The second difficulty—also fundamental—refers to the wealth of material which may be included in the term 'educational psychology'. From time to time the well-worn controversy as to what constitutes a liberal education raises its head anew. No satisfactory answer is given, but a restatement of the problem is periodically required. The reason why it is mentioned here is that the most modern setting of this ancient problem would appear to show some analogy with this difficulty of over abundance of material in the realm of educational theory. It is argued, for example, by those who defend the increasing specialization along some particular line of new university colleges, that any branch of knowledge, if treated properly, may become an instrument of liberal education, that even a so-called 'technical subject' will in its exploration provide contacts with so many other subjects that it becomes the key to a wealth of cultural knowledge. The subject of Geography with its many ramifications comes readily to mind in further illustration. Now the theory of education may be taken as another illustration of this doctrine. We are not here submitting that alone it could form a sufficient "educational organon", but its ramifications are so vast, and its contacts so many, that it is not surprising that the student or young teacher, to whom educational theory may be only

one of several subjects of study, is apt to be overwhelmed by its extent.

We may inquire initially into some of the branches of educational theory with a view to deciding which may be the most profitable line of attack for the beginner.

First of all there is the question of the aim of education. Statements of the aim of education abound, and while we see in each a measure of truth we recognize the need for all. It nevertheless remains true that we prefer the one which we formulate for ourselves and further that some of the most successful teachers have never formulated for themselves a precise verbal statement of what it is that they are trying to do. If we give serious attention to the aim of education we may go back to Plato's Republic and search the history of philosophy. We are brought up against many well-known arguments in defence of which much that is inspiring has been written. Is education an art, a science—or a craft? What is the distinction between education and instruction—between the educator and the teacher? 'The best teacher may be the worst educator' was the subject set for discussion in a recent examination paper in the Principles of Teaching. An adequate discussion of this statement would involve a wide acquaintance with the evolution of educational theory. It may be argued that any text-book on the theory of education should logically start with some attempt at a definition of the aim of the process to which its pages are devoted. In this instance it is proposed to postpone the definition of the aim until some discussion of the process and practice has provided a necessary background.

Another topic with which we quickly get involved in our survey is the distinction between education by life and education in schools. While this is clearly related to the questions outlined in the preceding paragraph, it has yet a more immediate application to problems of educational practice. The distinction implied has a recognizable bearing upon problems of curriculum and method, and many of the 'experimental schools' of to-day have as their acknowledged aim the reconciliation of the two factors involved.

We are familiar with the reiterated statement that at no time has there been a wider interest in educational problems than at the present, and at no time has this interest taken a more varied and practical form. Schools are formed in which to express and work out a formulated or at least suspected theory. If it were possible to obtain first-hand acquaintance with the principles upon which these pioneer schools are run there would be little doubt that a complete survey would bring us into touch with most of the aspects of educational theory. But for the most part we have to acquire knowledge of them at second hand, and with such a variety of emphases it is difficult sometimes to select and arrange into a well-ordered whole. Furthermore, the majority of teachers are faced with the fact that for them the type of school in which they are to work is prescribed and that, even under the most enlightened educational authority the degree of freedom is of necessity limited. He, the teacher, may glean inspiration from this or that experiment, but he must cut and adapt the practical expression of his inspiration to meet the needs of the establishment in which his work lies.

The existence of types of educational institutions introduces yet another important aspect of many-sided educational theory. Since it is held desirable that all children should receive some measure of education in school we are confronted with a complex system of educational institutions, and it is well to know how each branch of the system fits into the plan of the whole and the nature of its peculiar problems. Educational institutions are classified on various bases. The age limits of the pupils attending is one possible basis which would involve corresponding distinctions in curriculum and methods. But within the same two-age limits are to be found types of schools differing sometimes in being free or not free, at others according to the type of education provided, which, in turn may be dictated by economic considerations, or by the abilities or defects of the children who attend them. In this connection we find another vast field of exploration, and it is clearly desirable that the teacher shall have acquaintance with its underlying principles.

We have also the literature which deals with educational psychology, treating of the whole question of child-development and embracing such apparently diverse topics as the growth of intelligence, the reaction of the child to the family, the organization of groups, and of the learning process. The experimental schools of to-day are for the most part concerned with the interpretation of one or other aspect of this subject. Is it necessary that the teacher should know something of educational psychology? Much has been written for and against the introduction of this subject into the Training College course. The opponents

have said that within the short space of time available it is not possible to acquire an undistorted view of the problem of mental development ; that the questions at issue suffer a false simplification and that, in short, the student is better occupied in acquiring the mechanism of instruction and discipline. And, viewing the complexity of this question of educational theory of which we have given a brief outline, it would appear that there is much to be said for this view. But on the other side also the arguments may be ranged, and they may perhaps be summed up in the statement that since the teacher is dealing with a living organism, it is advisable for him to know something of the way in which the organism behaves in certain conditions. True, every teacher, even one who is quite unfamiliar with text-books of psychology, knows a great deal about the way in which children behave. He amasses empirically a considerable volume of knowledge, and such knowledge, derived from first-hand experience, is held to be more valuable than any obtained from books. In the light of it he treats the children with what is dignified by the name of common sense. On the other hand it may be argued that no one will prefer to trust to experience to bring him the knowledge he requires if it is possible to obtain the rudiments of this knowledge beforehand. And it is in the belief that such knowledge may prove to be both interesting in itself and a help to successful work that the elements of educational psychology are here described. The teacher in a school and the educator in general are consciously taking over the life of a child with the definite intention of influencing

step is that it is in the interests of the child's own future relationship with the world in which he lives. We shall endeavour to show in the sequel what are the most important factors which influence the interaction between the child, and the environment which surrounds him.

We have admitted that the first necessity for the young teacher is to prove himself efficient in his work. The criterion of efficiency is not easy to establish, but a working rule is generally held to be the progress in educational attainments made by the children in the class, and the presence of orderly activity within the class-room. That is to say, the efficiency of the teacher turns upon the successful learning and the social conduct of the child. Instruction and discipline indicate in the narrower sense the primary concerns of the teacher.

They will serve also as suitable titles for the two parts of this book. Under each heading the problems for discussion will take us far afield, and the further we travel the more clearly we shall see that they are in reality but two aspects of the same problem.

What is to be taught is for the most part laid down by external authority, but how it shall be taught depends upon the application of individual initiative to certain well-tried principles. This is the problem of method. The young student learns that there are certain well-defined rules which should guide his method of imparting knowledge. In addition to the general principles there are certain others which apply to the teaching of children in large classes; and yet others which apply to the teaching of special subjects. It is a commonplace of all books on the methods of

teaching the various subjects of the curriculum that such methods are evolved from two considerations—

- (1) the nature of the subject to be taught ;
- (2) the reaction of children of different ages to that subject.

It is, for example, argued that in the teaching of history to children the "logical method must give place to the psychological". What exactly is meant by the psychological method? Different people would probably give to the phrase slightly different shades of meaning, but all would agree that it implies that the child who is to be taught is a factor in the case.

In other words, all methods of teaching are the natural corollaries of methods of learning. Modern emphasis is on methods of learning. If then we would know how to teach we must know something about the way in which the child learns.

CHAPTER II

EDUCATION AND PSYCHOLOGY

* It is not possible to condense into a single chapter the established principles of teaching which have filled many volumes of educational writings. We may, however, try to show the connection which exists between some of these well-tried principles and the development of the children on whom they are practised, and to indicate if possible the avenues of interesting research which their exploration opens up.

Maxims of Procedure.—First of all it is considered necessary that the teacher shall to some extent ‘prepare’ the lesson which he is about to give. This preparation is not only to ensure that the teacher is himself conversant with the knowledge which he has to impart. It is specifically a preparation in which the children are to be an important factor. The questions which the teacher puts to himself are: “What do the children already know, how will they best assimilate what I have to tell, how can I ensure that the knowledge they apparently gain shall be an active part of their equipment, ready to function when it is required?” And the answers to these questions are embodied in what is usually referred to in notes of lessons as the Procedure, or, under an older classification, as ‘Method’ dubiously opposed

to 'Matter'. From time to time so-called Maxims of Method have been formulated, and if to-day we are inclined to deprecate the rigidity which they imply, we none the less follow in effect the principles of some at least. "From the known to the unknown" is considered fairly safe, if the proviso is added that the 'known' must not be artificially brought forward to supply a suitable jumping-off ground for the unknown. The teacher who, for example, introduced a lesson on the Spanish Armada by showing the picture of a drake is held to have misconstrued the implications of the maxim. But we do believe that the child best assimilates new experience through the experience he already possesses. Psychology would add to this belief that it is only in virtue of past experience that new experience is interpreted. This suggests that the course of life is marked by an ever-increasing complexity of experience, more or less closely interwoven, or in modern parlance more or less completely integrated into a functioning whole. From this train of thought we may go back and try to imagine the foundations of this edifice of experience, and we are brought up against the obstacle that the beginnings are not altogether simple; that the situations to which the baby reacts most readily are not those which seem to us the simplest. And so we are brought to the famous dictum of William James that to the baby the world is a "big blooming, buzzing confusion", and that this confusion must first be split up before it can be reinterpreted. The other well-known educational maxim "From the simple to the complex" may then not always be an infallible guide. It would appear to depend very largely

on what is to the child a working unit rather than on what is to the adult teacher a simple hypothesis. There was a time when considerations of the kind instanced above were linked up with what was called the doctrine of apperception, which dealt with the manner in which experiences were not only linked, but integrated, the application of which to the teacher's task was emphasized most particularly in reference to the use of illustration. To-day, while we speak less of apperception we use the terms—perception—cognition—and sometimes preperception. These terms deal specifically with the child's acquisition of knowledge—with his growing control over the environment. We shall be content to group the factors which appear to guide this growing control under the term 'the learning process'.

Interest.—The young teacher of to-day is perhaps not unduly harried by such cut-and-dried maxims as we have instanced. But he is urged over and over again that no teaching can be successful unless it utilizes the interest and activity of the child. It has been found necessary to stress the fact that interest is not synonymous with amusement, but that it involves a purposive activity which brings its own satisfaction, something akin to play, but effectually diminishing the barrier between play and work. And as soon as we come to analyze this factor of 'interest' and the criterion of play we are plunged perforce into a highly psychological medium. Many will immediately speak of instincts and sentiments, and all will refer to the necessity for activity. The practical teacher may retort that he at least knows interest when he sees it and that origins are therefore

irrelevant. He may add amidst approval that a certain amount of drudgery is essential and that such drudgery has the valuable attribute of being a good training instrument of character which will help the child in his later dealings with an unsympathetic world.

It may be defensively argued that it is well to know what there is to be known, or what is at least surmised, about the evolution of interests if we are to avoid a hit or miss appeal to a vaguely apprehended 'faculty of interest'. But as soon as we start to explore the field we find ourselves involved in the consideration of emotional aspects, and with the organization of experience by the child from his earliest years.

Individuality.—We spoke in a previous chapter of the degree of critical attention which is being focussed from all sides upon the educational methods of to-day. We spoke also of the many statements of the aim of education which have from time to time been formulated. A study of these statements reveals a periodic variation of emphasis. In one, for example, emphasis is laid on character, in another on value to the community, in yet a third on complete living. Such variation would seem to reflect the attitude or bias of thought of the age in which the statement was written.

"Every age", says Sir John Adams, "demands a new statement of its educational theory, just as it demands a new translation of a classic". At the present time the emphasis in the educational ideal is essentially on the individual.

No teacher can escape, even if he would, the plea for so envisaging educational aims and methods that

the individuality of the child is given free scope for its expression. We may quote in this connection the words of Sir Percy Nunn. "We shall stand throughout on the position that nothing good enters into the human world except in and through the free activities of individual men and women, and that educational theory and practice must be shaped to accord with that truth."¹

The educator who in this belief approaches his task is confronted by two important factors, which call for his consideration. On the one hand are the "impulses" of childhood. We use the term impulses at this point in a loose, general way, but it must later be subjected to a rigorous and scientific investigation. On the other hand there is the factor of a complex society in which the development of the child will take place. The task of the educator may be interpreted as an attempt to secure harmonious interaction between these two factors, or, if we wish, to harness the first in the service of the second. It is well that we should realize at the start that some degree of conflict between them is inevitable. We are reminded that the individuality which is stressed can only be worked out in a social milieu. The recognition of this truth is reflected in the subjects of the school curriculum not less than in the "moral" habits which it is sought to cultivate in the child.

The problems of the educator and of the psychologist.—If then the problem of the educator can be defined as the temporary control of environment to produce a desired resultant product, he must join the psychologist in the study of behaviour. He must be prepared

¹ *Education: its Data and First Principles*, p. 4.

to investigate the factors which appear to determine the behaviour of the living organism, to compare the behaviour of the human being with that of animals and to compare the behaviour of the individual with that of an organized group. He must ascertain as far as is possible the nature of the differences he may expect to find in the behaviour of different individuals, and the extent to which such differences may be considered as given at birth or as the result of the selective working of the environment. This is the sphere of work of the psychologist. It is not necessary to discuss the different definitions of the object of psychology which are given in text-books on the subject. The types of investigation which we have outlined are fundamental in its field of action, and we believe that they are no less indispensable to the mechanism of the teacher's craft.

There is, however, one difference which may suggest itself between the fields of work of the psychologist and of the educator. The psychologist is not primarily concerned with the moral values of the behaviour which he studies. The educator on the other hand is concerned with the operation of such values in the behaviour of the child. He may well, however, follow the psychologist in omitting to praise or blame not actions, but the factors which contribute to produce them. A detached and impartial attitude is an indispensable condition of proper understanding and of consequent educational treatment.

We may then take it that the questions which confront both the psychologist and the educator are as follows: Here is an individual. How does he act in certain conditions? Why does he act in this way?

The educator may add to these the question: In what way do I wish to modify this action? We have seen that the teacher of to-day qualifies the professed aim of modification by saying that he wishes at the same time to preserve the individuality of the child. The free activities of individual men and women which have been claimed as the only source of benefit to the world at large are included in the aims of education. We must not assume that such a concept implies simply that the individual does exactly as he likes. We are aware that the actions of all of us are circumscribed constantly by the environment in which we live. We know also that what we call happiness does not depend upon the extent to which we cast aside the restrictions of society. We are familiar with the so-called spoilt child and we often speak of "spoiling" as unfair to the child. At the other end of the scale are the individuals who appear, as we say, to possess their own souls.

By this phrase we imply something more than the so-called strength of character which suffers adversity with fortitude. It denotes an individual who, while adjusting himself harmoniously to the conditions of life, yet contrives to preserve in all his activity a unity which is the unmistakable measure of his self-realization. This is the type of individuality which we wish to preserve throughout the educative process, and it is in this sense that the concept of freedom must be understood.

Methods of Study.—But in order to understand in any sense the process by which the freedom of the individual works itself out we must consider the

heritage which he brings into the world, and the extent to which this heritage governs his movements in later years. There are different ways in which this study may be undertaken. In the first place there is the child-study movement inaugurated by Rousseau, which consisted in the making of extensive but not always very scientific investigations of the child's activity, from which certain conclusions as to his correct educational treatment were drawn. To-day this method is to a large extent supplanted by a more scientific technique. There is on the one hand a reliance on the case history of the child. Such history concerns itself with the record not only of the child's physical and mental activities but also with that of his parents and grandparents. No incident which may help to account for the child's present behaviour is considered as insignificant. Such a course involves, it is clear, a definite theory as to the nature of the influences of the factors of heredity and environment, which must be taken into account. For the moment we will however turn our attention to a third method of attack which is rapidly achieving a paramount importance. Without assuming any ready-made laws, the behaviour of the individual in very definitely circumscribed conditions, is recorded. So far as is possible the environment is controlled in such a way as to allow only for the manifestation of the particular factor which it is desired to investigate. In other words the conditions are made to approximate as far as possible to those of the scientific laboratory. An analogy will perhaps make this clearer. If in the class-room the teacher wishes to demonstrate the fact that air has weight he makes the conditions

of the experiment such that all irrelevant considerations are excluded. The composition and expansion of air, though equally demonstrable facts do not in any way encroach upon the present experiment. The experiments of the scientific laboratory claim for themselves in consequence a recognizable degree of reliability.

It is not easy to obtain equally prescribed conditions for experiments on human behaviour. If a list of nonsense syllables is written on the blackboard and a group of students asked to commit them to memory, it could not be claimed with any degree of scientific accuracy that the varying lengths of time taken by different students formed an accurate estimate of their respective facility for memorizing. But let us imagine a group of twenty students who on five successive occasions memorized the lists of syllables in exactly the same time and suppose that this group of students was then subjected to a further series of experiments in which the special method of memorizing was prescribed. In that case we should have an approximation to the conditions of a controlled experiment.

In all the observations of children which the teacher may wish to make he must realize that the more nearly the conditions approximate to those of a truly scientific method the greater will be the validity of his conclusions. In our study of the behaviour of the individual we shall then find it well to begin with a simple account of the scientific basis of the mechanism of the simplest reactions. From this study we can proceed to the consideration of learning and of disciplined activity.

REFERENCES

- WARD AND ROSCOE. *Approach to Teaching*, Chapter III.
Suggestions, Board of Education, pages 8-29.
- NUNN. *Education, its Data and First Principles*, Chapters I and III.
- RUSSELL. *Education*, Chapters I and II.
- ADAMS. *Modern Developments in Educational Theory and Practice*, Chapter II.

PART I

THE LEARNING PROCESS

CHAPTER III

AN ELEMENTARY STUDY OF REACTIONS

Terms. Stimulus and Response.—If a bright light is suddenly switched on in a dark room in which you are sitting you involuntarily blink. In scientific language we may express this event by saying that to the *stimulus* of the light you *respond* by blinking. The terms stimulus and response are in constant use in the attempt to explain the mechanism of behaviour. It is of course clear that the mere use of these terms does not take us very far towards elucidating the nature of the factors which produce the particular form of behaviour which we are studying, but it is convenient to have a simple and cut-and-dried terminology to express the beginnings of the process. When we try to analyze more fully the means whereby a particular stimulus evokes a particular response, we are brought face to face with a much more complicated process. For the moment however we may consider a list of ordinary activities and try to relate them to the stimulus response method of classification. We may begin by a consideration of a few very simple

acts and then proceed to a more complicated variety. Let us take for example the following list—

| <i>Stimulus.</i> | <i>Response.</i> |
|-------------------------------|--|
| 1. Flash of light | Blinking of eye. |
| 2. Sudden loud noise. | Start or sign of fear. |
| 3. Pin-prick on hand. | Withdrawal of hand. |
| 4. Sight of a telegram. | Varies according to expectation or to previous cognate experience. |
| 5. Sound of college bell. | Varies according to time of day or to individual time-table. |
| 6. Sight of beautiful sunset. | Varies according to emotional disposition of individual which in turn varies according to past experience. |

It is clear that in the first three of the examples quoted there is no doubt or appears to be no doubt as to the nature of the response to the particular stimulus applied. In the case of the last three, however, the stimulus is much more complicated and the nature of the reaction depends upon the meaning of past experience. We may then feel justified, after even such a cursory survey, in recognizing a possible cleavage in variety of reactions according to the degree in which they may be modified by past experience. This raises the very important question of whether we are able to react in ways independent of previous experience. This in turn raises the further question of whether we are born with a certain repertoire of unlearned reactions, if so of what types these are composed and whether all unlearned reactions are of the same type. From this consideration arises the familiar classification of reactions into learned and unlearned. All these questions are of very real

importance to the educator, and must later be considered in some detail.

Conditioning.—It is clear, however, that whatever may be the relations of our activities to-day to certain assumed inherited patterns of behaviour, we are constantly changing in some respect the form of our behaviour in a given situation. It is safe, if non-committal, to assert that such change is the result of environmental agencies. We may consider here that process known in psychological theory as conditioning which offers a simple though incomplete account of the process by which initial reactions become changed. The example most frequently quoted is that of the child who first approaches a lighted candle. To the brightness and attractiveness of the stimulus available it is probable that he will react by an attempt to grasp the flame. As a result he experiences a pain in his hand which leads to the subsequent reaction of the withdrawal of the hand. If left to himself the child may repeat on subsequent occasions the same sequence of reactions to the same presentation of the stimulus. But, sooner or later, there will come a time when as the result of his previous experiences the child will cease to react to the sight of the candle flame by the reaction of grasping, and may instead substitute the reaction of withdrawal even from the sight of the flame. In such a case the child would be said to respond to the same stimulus by a substitute reaction or it might be said that his reaction had become conditioned by his previous experience.

A well-known experiment which illustrates the same point was made by Professor J. B. Watson. Starting with the hypothesis that a sudden loud noise will

evoke a spontaneous reaction of fear in a young child, he chose for his experiment a small boy who had never shown any spontaneous fear of a rabbit or other furry animal. The child was shown a rabbit towards which he manifested the positive reaction of reaching for it, but at the moment when the child's hand was stretched out to take the rabbit, a sudden loud noise was made behind the child, the source of the noise being unknown to the child. He reacted immediately by showing signs of fear. On a subsequent occasion the sight of the rabbit alone was sufficient to call forth the same signs of fear and avoidance. Watson's conclusion was that many of the fears of childhood and of adult life may be accounted for by precisely some such process of conditioning in which the normal fear producing stimulus is associated with one in itself harmless.

Substitute Stimulus and Substitute Response.—The two examples of conditioning which we have considered illustrate a difference in type which is made the basis of a twofold classification of conditioned reactions. In the first example the stimulus afforded by the lighted candle remained unchanged. In the second the stimulus which produced the same response of fear was varied. The two resulting types of conditioning are referred to respectively as substitute stimulus and substitute response. It is not necessary to press the distinction too closely. It must often appear that the conditioned reaction may be explained equally well along the lines of either contingency. A point however which must be stressed emphatically at this juncture is that the mere use of the terms conditioning, substitute stimulus and substitute

response does not in itself elucidate the nature of the process which is operative. The terms are useful because they are simple and non-controversial and their value lies in the provision they afford of a standardized medium in terms of which the first statement of the problem may be made. The real clue to the understanding of the nature of the process at work must be sought in the concerted mechanism of bodily processes.

Conditioning in Education.—We can if we wish refer this modern terminology to the particular task of the teacher or educator in general without doing violence to ideals or methods. There is in all deliberate education a control of the environment with the purpose of modifying the reactions of the child. The term modify must be held to include enlargement and refining, and not merely to signify the substitution of one reaction by a different one. We may not feel inclined to describe a lesson in Arithmetic or an experiment in self-government in terms of substitute stimulus and substitute response, but if we made the attempt we should probably find that we could make our meaning clear.

Two examples may be quoted.

A child roused to anger by the thwarting of some activity will if left to himself probably react by some gesture of aggression towards the offending party. Fighting, or at least an angry push is recognized as the reaction to be expected from a child who is thus thwarted. One of the first educational efforts of the parent and teacher is directed towards diverting this tendency into other channels. This "sublimation" of anger is regarded as one of the most valuable products of

education and much has been written concerning the triumphs of individual and social enterprise which have their roots in anger. For the moment we may, if we wish, look upon such sublimations as an obvious example of a substituted response. In the province of the school curriculum we may find yet another example, in the progress of the child in learning to read. It is difficult for the child only newly versed in the art of reading to learn to read silently. At first the sight of the written symbols evokes the spoken word, at a somewhat later stage the child may refrain from pronouncing the word aloud but makes the form of the sound with his lips, and finally he reaches the stage at which by no perceptible movement does he reveal his interpretation of the symbols. Here we have an example of a series of substitute responses. Or, if we contrast the casual glance at the beginning or upper vertical half of a word which suffices for the correct interpretation by an adult with the laborious concentration required by the beginner we may legitimately refer to it as an example of a partial stimulus calling forth a whole response.

Questions for the Educator.—If we wish to understand the processes of growth in which we as teachers propose to take a very definite share of control, it would be well if we could with certainty answer the following questions :

- (a) What reactions can be evoked spontaneously in the very young child by application of the appropriate stimulus, and not be afterwards modified by acquired experience ?

- (b) What reactions present at birth show themselves capable of early modification ?
- (c) By what processes are the complicated reactions of adult life built up ?

It is not possible, at the present stage of psychological knowledge to answer all of these questions with complete certainty of detail. The adequate discussion of them would raise many controversial points. But we are at least able to recognize the main principles on which the bodily mechanism of behaviour works.

Bodily Mechanism of Behaviour.—It is a salutary thought to remember that the most complicated activity, as for example, the organization of a big social scheme is only carried out by the instrumentality of the same bodily organs which function in such elementary responses as eating and walking. It is not necessary to enter at this stage into the precise study of the physiological mechanism by which these processes are carried out. It is sufficient for us to consider the organization of the body under the following three headings :

- (a) sense organs which receive the stimuli from the outside world and from within the organism,
- (b) reacting organs such as the muscles and glands,
- (c) connecting organs consisting of the brain, spinal cord and nerves.

The human being has at birth a certain definite structure. In different individuals there are certain differences in structure which will in turn produce

certain differences in response, but in general we may say that these differences in structure are very slight in comparison with the vast degree of similarity which exists. We take for granted the common equipment of all, and tend to stress perhaps unduly the later differences in behaviour which ensue.

The question of innate endowment.—Perhaps the most difficult of all the tasks of the psychologist is to determine which reactions may truly be described as innate and which are the result of an early conditioning by a selective environment.

A further complication is introduced when the possibility of habits acquired during the nine months embryonic life of the child is considered as a relevant factor. The introduction of the word 'habit' at this juncture calls unfortunately for some preliminary definition. It is a word much bandied about by all and an indispensable part of the teacher's vocabulary. But to do justice to its implications would require an inconvenient digression from the present subject of discussion. It may then suffice to say at this point that a habit is essentially an acquired reaction which is characterized by a certain stability and uniformity.

It is important to bear in mind that the formation of habits may have begun before the birth of the child and that from birth onwards this process continues at a very rapid rate. Watson in America has made some important experiments with a view to determining the nature of the reaction equipment of the young child at birth. He gives the following list of reactions, which can, he claims, be evoked in a very young infant by application of the appropriate stimulus.

| <i>Stimulus</i> | <i>Response</i> |
|--|--|
| Change of temperature or bright sunshine. | Sneezing. |
| Slapping or other artifice used to establish breathing, hunger, or pain. This response becomes very early conditioned as the result of the attention which it secures. | Crying. |
| Light. | Early unco-ordinated eye movements. |
| Satisfaction after feeding or tickling of sensitive parts of the body. | Smiling. |
| Contact of chin with mattress in face downwards position. | Turning of the head. |
| Slight stimulation of the skin. | Unco-ordinated movements of arms and legs. |
| Stimulation of the lips of a hungry baby by the nipple. The sight of the mother or of the feeding bottle will in time call forth these responses. | Feeding Responses. |
| A thin rod placed within the baby's hand will produce a grasping reflex sufficient to support the weight of the child. | Grasping. |

The above selection includes the varieties of response which Watson found in the young child. To them must of course be added the bodily functions of breathing, digestion and excretion. It must at first sight appear that the list of simple reactions here enumerated has little connection with the process of education in school. By the time the child comes into the teacher's care, even in the nursery schools, he is already far removed from this simple status. He can walk and talk and he has acquired a large number of habits unaccounted for by this preliminary survey. Already the teacher and parent of the child

of three refer to the disposition of the child and relate his conduct to the complicated standards imposed by the existing society. It would seem, therefore, that the intervening space of a few years must have been one of extreme significance for the child, and those psychologists who attribute to the first five years of the child's life an importance never exceeded by a later period, would appear to have reason on their side. The line of safety would appear to be to start with the few simple facts which can be ascertained by experiment. Above all we must not lose sight of the fact that the life of the living organism is continuous from the moment of the fertilization of the egg in the body of the mother. Of the influence of the nine months embryonic life on habit formation nothing can as yet be said. We can only regard the birth of the child as a momentous episode in its general stream of activity. Those responses which we have instanced as showing themselves present shortly after birth come at once under the influence of the physical environment and are modified. The vague movements of hands and limbs become co-ordinated by a progressive series of organizations into the elaborate manipulations with which we are familiar in the child of school age. Under the care of the school they are still further organized into more and more complicated patterns. The process of learning in any sphere may be looked upon as analogous to the process by which the child's random movements of its limbs become organized into the complex movements of walking.

Emotions.—There is, however, one sphere of activity which must even at this early stage of investigation be given a preliminary special notice. We have

alluded above to the references to a child's disposition which are made at a very early age. To even the least psychologically minded parent or teacher the term "disposition" conveys a meaning not covered by any of the list of reactions we have enumerated. It suggests factors which we are accustomed to describe as emotional. The teacher believes with truth that his work with the child is not covered by the mere inculcation of knowledge or with the development of forms of practical skill. He believes that he is further concerned with formation of character and that in such development the emotional element is of prime importance. Let us say at once that this problem of emotional activity is the most difficult of all those problems with which the psychologist is confronted. Some of the difficulties in its consideration must be outlined at a later stage. For the moment we will consider simply the nature of the emotional reactions which can according to Watson's experiments be demonstrated in a very young baby.

He was fortunate in being able to secure for his experiments a hospital environment under his own control. He could therefore apply tests calculated to produce an emotional reaction to young babies from birth to the age of three. It should be explained that Watson had become suspicious of the validity of the assumption that children are naturally afraid of furry animals. Many tests on children brought up in this controlled environment were tried and a large number of furry animals was introduced. Watson found that the general response was that of reaching for the animal, in which we may see evidence of a desire for playful manipulation rather than an

avoidance due to fear. In the light of these results the next question which arose was, "Which if any are the the recognized emotional reactions which can be evoked spontaneously shortly after birth. Experiments carried out by Watson on young babies suggest that there are three types of emotional reaction which can be aroused immediately by the application of the appropriate stimulus. These are distinguished as fear, rage, and love. The situations which produce them and the signs of their manifestation are briefly these. A sudden loud noise or loss of support will produce in the baby irregularity of breathing, a violent start, crying, and other evidences of bodily disturbance. These signs are accepted as evidence of a fear reaction. An attempt to restrain the free activity of the baby's movements will cause stiffening of the body, redness of the face, often succeeded by blueness, and screaming, and to this group of bodily reactions we give the name of rage. It may be of interest at this stage to compare this early evocation of rage in the young child with the similar effects upon ourselves of any attempt to interfere with our freedom of movement.

Lastly, Watson found that stroking and tickling of the baby's body produced from him sounds of gurgling appreciation and a smile of content. In this set of responses Watson sees the first expression of affection or love. The technique of experimental investigation is as yet not sufficiently developed to enable us to say with certainty that these three emotional reactions are the only ones which can be spontaneously evoked in the very young child, but the work of Watson and his school points to the

necessity for caution in assuming indefinite numbers of inherited emotional reactions. Watson's theory is that all the complicated emotional patterns of our later life have been built up by a process of conditioning on these three simple inherited patterns. He himself gives an example of such conditioning in the case of fear. The same children who showed no spontaneous fear of a furry animal changed their reaction to one of marked fear and avoidance when the presentation of the animal by the experimenter was accompanied by a loud noise in the rear. The original unconditioned fear stimulus provided by the loud noise became associated with the rabbit presented at the same time, and on subsequent occasions the sight of the rabbit alone was sufficient to produce the fear reaction.

The whole question of the organization of emotional patterns must be reserved for further consideration. This preliminary note has, however, been inserted for two reasons. In the first place it is clearly not advisable that we should begin our study of behaviour believing that the emotions, as we understand them, are wholly outside the scope of the scientific method of experiment. In the second place the outline of some of the main factors operative in the life of the very young child which we are about to undertake will show along what lines the organization of emotional developments probably begins.

REFERENCES

- WOODWORTH. *Psychology*, Chapters II and III.
WATSON. *Behaviorism*, Chapters II and III.

CHAPTER IV

THE FIRST YEARS OF A CHILD'S LIFE

It is for the teacher a sobering reflection that by the time the child passes into his care, at the age of five or six, the essential foundations of his "character" have been securely laid, and that nothing he can do for the child during his school life can hope to compete in importance with the influences of his earliest years. We have long been accustomed to the controversy which centres round the relative importance of the two factors of heredity and environment. While the present verdict is against the possibility of the transmission of characters acquired during the life-time of the individual the trend of modern thought is towards the belief that to the environment must be accorded the major share of the shaping of individual destiny. We may not be inclined to go all the way with Helvétius in saying that "Education peut tout" or with Professor J. B. Watson when he says, "Give me a dozen healthy infants well formed, and my own specific world to bring them up in, and I will guarantee to take any one at random and train him to become any type of specialist I might select ; doctor, lawyer, artist, merchant chief and, yes, even beggar man and thief regardless of his talents, penchants, tendencies, abilities, vocation and race of his ancestors", but we do at least believe that the conditioning

processes of a controlled environment are the supremely effective agent in producing the final result. To this we must add the belief that it is the environment and conditioning of the earliest years which have the greatest significance. The first year of the child's life is more important than any which succeeds it, and the first five years outweigh in moulding force the rest of a life-time.

The teacher has for the most part little share in the formative influence in these earliest years. The responsibility is with the home, but it is none the less essential that the teacher should know along what lines the relatively mature individual entrusted to his charge has progressed. It is difficult but necessary for him to realize that the small, ignorant, and in many ways helpless little person, to whom he hopes to impart the rudiments of knowledge, has already suffered the most important experiences of life. It is only possible to lay down in this short space a few brief indications of the stages of development in the child's earliest years.

The Vital Functions and their psychological importance.—Before birth the baby has been furnished without effort with all that he requires. The state of undisturbed content is never reached again, and is only approximately reproduced in sleep. At birth all this is changed. The baby can now only secure food by the exertion of some muscular effort on his own part in response to the stimulus provided by the mother's breast. We do not speak of the intelligence or will-power of the new-born baby. The sense-organs which we think of as the gateway of all knowledge are not fully operative and the previous

experience of the baby is quite inadequate for the exigencies of his new environment. The baby is, we will assume, born with a healthy body and with sense-organs ready to function. But for the moment it is the vital functions of feeding, breathing and excretion which are all important for the baby's welfare, and to these we must look for the earliest and most significant formative influences on later character development. When these functions are satisfied the child shows the sign of physical well-being in a healthy sleep, an approximation to the prenatal state of content.

It is then necessary that we shall consider from the psychological point of view the significance of this group of functions. "Those regions of the child's body which are concerned with the vital functions of breathing, feeding and excretion are the first avenues of contact with the external world. The sensations derived from them provide it with its first and therefore deepest and most enduring emotional experiences. By their agency it gains its primal notions of the world and its sequential ideas can be expressed only in terms of these original experiences. Their psychical significance is therefore paramount."¹

For our purpose the chief lines of influence which must be sketched are in connection with the emotional reactions of love and fear, and with the child's consciousness of self and power. The organic state of hunger in a child leads to an uncomfortable tension, the relief of which consequent on feeding produces pleasure. The same is true of all other bodily functions. We must now assume that by some process the pleasure

¹ *Children in Health and Disease*. Forsyth.

experienced by the relief of tension becomes associated with the object which secures this relief. So the child's first affection is directed towards the mother who feeds it or towards the nurse who superintends its bodily welfare. There comes a time when the mere sight of the mother will still the baby's crying. We see here a process analogous to that of conditioning. In the case of the functions of breathing and excretion no external agency is required to produce the desired relief. The child himself effects the required result, and it is probable that along these lines develops his first consciousness of self and of power. The temporary holding of the breath or of the excreta serves, by heightening the tension, to increase proportionately the relief of discharge. Such playful manipulation is a phenomenon frequently to be observed in young children. Moreover, the alarm which such a procedure causes in those responsible for the well-being of the child must contribute to an association with the feeling of power and of self-assertion.

Much has been written on the psychological significance of the emotional attachments aroused by these simple organic functions and of their probable connection with later disturbances or with the general direction of future activity. For the teacher, however, one or two salient points may be selected as sufficient for immediate emphasis. *The first* is the all-important role which they play in developing awareness of the child. Most books which deal with the care of the young baby assert with emphasis that the training of the baby in habits of cleanliness and orderly routine cannot be begun too early in life. Such training

involves it is clear some degree of interference with the spontaneous gratification of primitive needs. More particularly is this the case with the function of excretion. Such interference is necessary, and it is work of the parent or nurse to see that it is effected with the minimum of emotional disturbance. The great lesson which modern psychology would appear to have to teach in connection with habit formation in the young child is that so far as is possible a personal and emotional reference should be eliminated. There is a measure of inevitable conflict between the demands of civilized society and the primitive pleasures of the young child. Looking ahead we may view the course of life as a conflict between the contented passivity of prenatal life, and the claims of the often unpalatable realities of the external world. Much later unhappiness would be avoided by a recognition of these simple facts.

Early Sense Experience.—But, although as we have said, the vital organic functions are in virtue of their primacy of origin the most influential factors in the early life of the child, there develops side by side with them the exploration of the external world through the avenues of sense experience. The new-born baby is assailed by sense stimuli of different kinds, some from the external world and others from within his own body. It is considered doubtful whether in the first few days of life a child shows any response to stimuli of light and sound. The senses of taste and smell are of greater significance to the young child than those of sight and hearing. Shortly after birth he shows such reflex actions as crying, sneezing and sucking, and he can make certain

random movements with his limbs. He will also close his fingers round a thin rod, placed within his grasp, with sufficient strength to support his full weight thereby. He has no power of co-ordination of eye movements. Within his first month, the child will gaze steadily at bright shining objects, and he will start at a loud noise. He shows signs of pleasure when fed and warm and signs of discomfort when hungry wet or cold. Vocalization consists in the utterance of random sounds among which will be some of the vowel sounds.

In the next few months of his life the infant makes rapid progress. Some degree of co-ordination of muscular movement is attained. He will grasp firmly or attempt to grasp objects placed within his reach. The movement of the eyes is more controlled and the balancing of the head on the shoulders is accomplished. In particular there is to be seen the beginnings of co-ordination between sight and grasping movements and between hearing and the turning of the head. At the same time the reactions of pleasure and "unpleasure" are shown in response to success or failure of attempted muscular movements. He shows surprise by opening his eyes wide. The repeated presentation of the same stimulus evokes from the infant signs of recognition—the first symptom of familiarity. "The confusion of the world is beginning little by little to be dissolved."¹

Increasing Co-ordination.—It is surmised that at about the sixth month of his age the infant shows the first apprehension of himself. This momentous step is accelerated by certain observable factors. The

¹ *Children in Health and Disease.* Forsyth.

fascination of his fingers and toes for the young baby is a familiar subject and it is probable that his frequent explorations in regard to them leads to a growing awareness of them as a source of experience different from that afforded by external objects. This difference lies in the pleasurable experience furnished by the limbs by reason of their own sensitiveness to the baby's touch. Similarly the sensations of muscular effort are essentially different from those evoked by external objects. We feel compelled to assume that it is through the avenues of touch and muscular effort that the baby's first consciousness of self develops. The realization of the importance of these two instruments is of course carried over into the educational practice laid down by Madame Montessori and her followers. The frequent connection of his own name and certain specific activities also helps this awareness of himself, and, most of all, it is reinforced continually by the growing sense of power which develops along with the child's acquisition of skill in motor co-ordination and in talking.

We are inclined to look upon walking and talking as the great achievements of the child of pre-school age. We have seen that the first random movements of the limbs are entirely unco-ordinated; by about the seventh month the child can raise himself to a sitting posture, and this stage is succeeded by the standing position, the child holding firmly to some supporting object. When he takes the first step alone, generally towards the end of the first year, the great advance has been made. The rest is a matter of encouragement. Fear and pride may alternately delay or accelerate the achievement but gradually

the process is perfected and balance is slowly secured. Forsyth alludes to the period of eight to sixteen months as one in which the infant "matures his abilities". Such an expression acquires definite meaning when we consider the enormous advance in co-ordination of motor activities which accompanies this period. Locomotion becomes for the child an absorbing pursuit, and we see him repeating his experiments with an interesting environment again and again. The number of times which a child will repeat just the same action of reaching for a ball only to throw it down again may be taken as a measure of the satisfaction which this degree of mastery secures.

Talking.—In speaking of motor reactions we must not forget that talking itself must be considered under this heading. The baby's cry at birth must be looked upon as a reflex action provoked by the action of the lungs upon air. In the vocal sound so produced we must see the origin of speech. "Voice", we are told in books on speech training, is produced by the working of the muscles of the larynx on air expelled. The first sound produced experimentally by the baby will include by chance most of the vowel sounds and a few consonants. We are familiar with the repertoire of sounds of a young baby—a u ba ahgoo, et cetera. There can be no doubt that the association of sounds and objects by the young child is the result of human interferences. The constant repetition of the sound of the word and the presentation of the corresponding object by those who surround the baby at this stage of his life lead to inevitable association in the mind of the child. So, for example, to the

familiar ejaculation of the baby "ma" the mother replies by ministering to his wants and the child learns—we must so express it—that the pronouncing of this word produces the mother. Watson gives an account of an experiment in which he and his wife, by deliberate experiment tied up the sound "da", with the production of the baby's feeding bottle. The stimulus word was spoken immediately before the bottle was produced and the baby in turn when hungry pronounced the word to secure the bottle. He quotes this as an example of the "conditioning" process by which the association of words and objects is built up. To those who may yet retain an impression that the child applies without learning the words "ma" and "da" to its parents this experiment is instructive. Imitation is no doubt a key to the understanding of the growth of language but, as the discussion of this activity must be postponed, so for the moment we must be content to notice only the general lines along which the child's progress in speech is manifested. We must not, however, forget to notice the connection between the earliest sounds produced by the baby and the expression of primitive feelings of pleasure and pain.

It is probable that the child may be aware of the relationship between a sound and its object before he can express this relationship in speech. When first he can articulate the correct word in response to a given objective stimulus the most important step has been taken. The rest is an affair of organization into more and more complicated word patterns—the perfecting of verbal habits if we prefer that terminology. While children vary very much in the

rapidity with which they begin to talk it is considered that twelve words at the end of the first year would represent an average vocabulary. By the end of the second year four hundred and fifty, and by the end of the third one thousand six hundred, are, on the authority of Miss Drummond, an average number.

Summary.—In this rapid review of the life of the baby in his first year we have seen how, starting with a few unlearned responses, he has acquired, through the stimulation of his sense-organs by the external world, increasing powers of motor adaptation and of corresponding control. Such processes have culminated in walking and talking, in a growing discrimination between objects, in an increasing awareness of self and of power. On the other hand, prior in time to these exploratory movements, and, from the point of view of emotional development, of greater importance are the intra-organic stimuli which serve to disturb the state of peaceful sleep and which issue in definite bodily functions.

We have seen how, along these lines, grows up the first attachment of the child to the mother, the transmission of fears, the experience of pleasure and of pain. As the result of the interaction of these activities we can see an inevitable measure of conflict. The state of pre-natal contentment is incompatible with constructive exploration of an external world. We must consequently be prepared to see in the very young child that a degree of unpleasant disturbance is essential to the progress of manipulative control. We are accustomed to consider the effect of suffering in great works of art. An element of conflict enters in from the earliest months of the child's life, and

from this conflict grows control of the environment and a corresponding emotional complication.

Subsequent Development.—It is not necessary for us to consider in detail the next two years of the child's life. They are the period in which the activities we have just sketched are consolidated and extended. The question may here be asked "Is the child, during the first three years, being educated other than through his own spontaneous reactions to the varied stimuli of his environment?" The answer would appear to be that, while a child of this age can learn nothing except through his own efforts and contact with reality, it is yet possible for the adult to control the environment in such a way that the reactions which he wishes to establish will be evoked. We may speak of habit formation, conditioning or of suggestion according to the bias of our particular attitude. We mean that the adult can interfere with the environment, can regulate the situations with which the child is faced in such a way that experience will consolidate itself along certain definite lines.

If the term 'consolidation' or 'integration' of experience is the key to the child's subsequent development it is advisable that we should know more of the connecting bodily mechanisms which are active in this process.

The detailed study of the nervous system is admittedly difficult and there are many points which are not yet elucidated. Much is perhaps rather conjecture than scientifically established fact. The following chapter indicates in very bare outline, the structure and function of the nervous system. While such knowledge as it contains may not directly help the

teacher in his dealings with his class, it should help towards resolving a confusion based on mystification.

REFERENCES

The Nursery Years. ISAACS.

Children in Health and Disease. FORSYTH.

Difficulties in Child Development. CHADWICK.

CHAPTER V

THE BODILY MECHANISM OF BEHAVIOUR

We have already seen that from the psychological point of view behaviour can be most profitably considered as a response to a stimulus. Such a response is accomplished by means of the mechanism which is provided by the structure of the body. We have seen also that for the purpose of our investigation this mechanism may be thought of as consisting in (a) sense-organs, (b) reacting organs and (c) connecting organs. It will now be necessary to consider these divisions in further detail.

The Sense Organs.—When we speak of sense-organs the name at once suggests such a structure as the eye or ear. We are accustomed to consider ourselves as possessed of five senses by means of which we establish contact with the external world. When, for example, we speak of hearing a sound we believe that the sound which we say we "hear" is the result of certain vibrations registered by the ear. In this connection we should readily agree that the ear receives the particular stimulus. This same idea must be extended to cover all the other sense-organs.

The organs of stimulation are in general referred to as Receptors, and this term covers far more than is commonly included in the five senses. They are

further differentiated according as they are situated on the surface of the body or within it. Receptors which are situated on the surface of the body are known as Exteroceptors. Their function is to receive stimuli coming from outside. Examples of exteroceptors are the eye, ear, nose; all three of which are so constructed that they can receive stimuli from a distance, and the cutaneous sense-organs sometimes known as contact receptors which include the organs of touch, pressure, heat and cold, and pain. Incidentally it may be noted how the establishment of separate structures for this last group of functions is in itself evidence of the inadequacy of the old fivefold classification for any scientific study.

In addition to the well-defined sense-organs enumerated under the heading of exteroceptors there are also two other groups to be considered. The first of these consists in a number of organs embedded in the muscles, joints and tendons. They are stimulated by the movements of the surrounding tissues, and are for this reason referred to as kinaesthetic in function. Together with them must be included certain organs of position and equilibrium situated in the semi-circular canals of the ear. They form together what are known as the proprioceptors. The essential difference between the exteroceptors and the proprioceptors lies in the nature of the stimuli to which they respond. In the case of the one the stimuli were as we have seen external to the body; in the case of the proprioceptors the stimuli are furnished by the organism itself. If, on the other hand, we consider the difference in response corresponding to this difference in stimulus we see that in the case of

the exteroceptors the resulting response consists in well-defined muscular movements of which for the most part we are ourselves aware; but, in the case of the proprioceptors the resulting response is a more delicate adjustment of movement and balance, and since we are in general not conscious of the complexity of the adjustment, we often refer to it as automatic. Lastly, we must take into account sense-organs which exist within the body in the digestive, circulatory, respiratory and reproductive systems. They are known as interoceptors and not only do the stimuli to which they respond come from within the body but the response itself is confined to movements of the visceral organs. (The term visceral organs is used to cover the digestive, circulatory, respiratory and reproductive systems.)

Now of the three types of receptors which we have outlined, viz., the exteroceptors, proprioceptors and interoceptors, we have seen that, in so far as the nature of the stimulus is concerned, it is from without in the case of the exteroceptors and from within in the case of the proprioceptors and interoceptors. In regard to the nature of the response however, the result of stimulation of both the exteroceptors and proprioceptors is an adjustment to external conditions, while in the case of the interoceptors the response is confined to the viscera themselves. It is then on account of the difference in nature of the response that it is more usual to group together exteroceptors and proprioceptors, as connected with overt adjustment, and to leave for special consideration the interoceptors and visceral

reactions. Before turning to the response mechanism it is necessary to emphasize the fact that all receptors are so constructed as to be sensitive to only one specialized type of stimulus.

Response Organs.—The organs of response are the muscles and the glands. For the purpose of our discussion the muscles must be considered as divided into striped and unstriped, and the glands into duct and ductless.

The striped muscles which are also referred to as the voluntary muscles are those connected with the movable parts of the body. The contraction of the muscles, produces the required movement. The unstriped muscles, sometimes referred to as the non-skeletal muscles, compose the musculature of the visceral organs. Their movements are essentially slower and more continuous than those of the skeletal muscles, a distinction which is clearly related to the difference in function which they exercise. Turning now to the glandular organs of response it is not necessary to speak here at length of those glands which pour out their secretions by ducts with the functions of which we are familiar in the case for example of the liver, kidneys and sweat glands. Of greater importance for our purpose in the sequel will be the group of glands which pour their secretion directly into the blood stream. This group is often referred to as the endocrine glands or hormone secreting glands. They are at present the subject of intensive scientific research, and it is believed that they exercise a very far-reaching influence upon behaviour. The nature of this influence is not at the present time completely

understood, but there is reason to believe that it is particularly in connection with the emotional life of the individual that their effects are to be seen. At the present time it is only necessary to indicate briefly the description of the chief of the ductless glands.

The chief group and the one of which the functions have been most systematically explored consists in the thyroid, adrenal and pituitary glands. The thyroid gland is situated in the neck on either side of the windpipe. It secretes a substance known as thyroxin and it is now established that insufficiency of this secretion is responsible for the condition known as cretinism. The adrenal glands are situated above the kidneys, and it is known that their secretion, adrenin, plays active part in reactions of fear and rage. The pituitary gland situated in the brain exercises in respect of its two distinct divisions a marked influence upon the growth of the skeleton and upon the action of the other glands, particularly upon the development of the sex-glands. Of the remaining ductless glands it is only here necessary to mention the thymus gland which is active only during childhood ; it is situated in the upper part of the chest. We shall have occasion subsequently to refer again to the work of the ductless glands. It is only at this stage necessary to establish them as an integral part of the response mechanism of the body.

Connecting Mechanism.—Between the receptors which receive the stimulus and the muscles and glands which respond to it, connection is established by the whole nervous system. Before any coherent account of the mechanism of behaviour can be given it is necessary

to understand the structure and functioning of the nervous system. In this term are included

- (a) the nerve fibres
- (b) the central nervous system
- (c) the vegetative nervous system.

The nerve-fibres end in either a receptor or in a muscle or gland and are so constructed that the impulse which they convey can travel in one direction only. This direction may be either to the central nervous system carrying the impulse transmitted by the receptor, in which case the nerve-fibres are said to be afferent, or it may travel from the central nervous system outwards to the muscles or glands where activity is in consequence initiated. It is advisable that the student should have a clear idea of the structure of nerve-fibres, but a detailed description at this stage would serve to obscure the main object of the chapter, which is to give a concise idea of the bodily mechanism of behaviour as a whole. It will suffice to recall the essential fact that the neuron which is the structural unit of the nervous system consists of a cell body, a number of small branches known as dendrites and a longer (sometimes very long) branch known as an axon. When a receptor is stimulated the result is a definite chemical change which is transmitted as a nerve-impulse from the dendrites through the cell body and along the axon. The axon itself divides at the end into a number of fine endings which are in close contact with the dendrites of a neighbouring cell. There is not, however, actual established contact, and the impulse has in fact to traverse the

intervening distance. The point at which this "jump" takes place is known as a synapse. Because of the lack of actual continuity in substance the impulse experiences at the synapse a certain degree of resistance, and when we come to consider habit formation we shall see that the neural accompaniment of this activity is a lessening of resistance at the synapses.

It is now clear that the simplest unit of behaviour must consist of at least three parts, viz., the receptor, the connecting nerve-cells and the executant muscle. The complexity of mechanism which characterizes even the simplest of our actions corresponds to the increasing complexity of organization of the neural connection established through the central nervous system.

Central Nervous System.—The central nervous system must itself be considered in two sections—the spinal cord and the brain. A further subdivision of the brain into medulla, cerebellum and cerebrum is necessary to the understanding of resultant differences in organization of activity. The spinal cord is in itself a conducting medium for impulses conveyed by both afferent and efferent nerves. In the case of the simple 'reflex' actions which we have instanced the impulse is carried from the sensory receptor to the spinal cord and back to the muscle executants. In such a circuit we see an example of what is called a reflex arc at the spinal level. Such an arc is the real unit of reaction. But in addition to the simple co-ordinating mechanism which it exercises, the cord serves as the medium by which impulses are conveyed to and from the higher co-ordinating centres which are constituted by the brain.

The Brain.—The spinal cord is prolonged into a structure called the medulla which is also referred to as the brain-stem. The cerebellum is a small organ situated at the posterior part of the brain; we know that its functioning is connected with the maintenance of balance in the body; that it serves to co-ordinate the impulses received from the proprioceptors. The cerebrum or big brain is the most important organ of the human body. Its function is that of co-ordinating or integrating the impulses received from various sources and is seen at work in all reactions other than those of the few unlearned reactions which we have cited. The surface area of the cerebrum is increased by convolutions and in the cortex three areas may be distinguished which differ in respect of the type of neurons which terminate there. The names sensory, motor and association convey the broad nature of this distinction. It is unnecessary to consider here in detail the specific centres which are concerned with visual, auditory and motor activity. What is important to remember is, that before the impulse finally reaches the cerebrum, it has passed through a vast complexity of nervous arcs, and that before the resultant reaction is executed by the muscles, a similar complex series of associations is carried out through the intermediary of the arcs of the lower spinal level. The unit of reaction we must repeat is the nervous arc, and the process of organization is essentially that of the co-ordination of these arcs into more and more complicated chains. The evolution of the nervous system must be considered as proceeding along the following lines. The arcs of the lowest level are, those of the spinal cord

and in the lowest forms of vertebral life they constitute the greater part of the nervous system. The next stage was the formation of loops of increasing complexity which made possible the first beginnings of co-ordinated action. These became massed together to form large ganglia corresponding to the medulla and forming the origin of what developed later into the brain as we know it. The final stage consisted in a great increase in size of the cerebrum determined by an increasing complexity of arcs. The details of the cerebral cortex are not completely determined physiologically at birth, and it is on the subsequent development of the cortical areas that the power of learning by experience depends. In human beings the greater part of the cortex consists in what we have described as the association areas; in animals on the other hand the sensory area is the greater of the two.

The analogy between the functioning of the cerebrum and the workings of the telephone exchange system is one that is often stressed. Provided that it is not interpreted too literally the analogy is a useful one. We must, however, beware of over simplification of the task of understanding the very complex mechanism which is at work, by imputing to the cerebral-cortex an immediate and infallible power of decision, and of an equally immediate and infallible power of transforming this decision into action. The process of transmission and organization of nerve-impulses is a very complicated one. Repetition of the same activity increases the rapidity and ease with which it can be performed. The physiological counterpart of this facilitation must be sought in the resistance offered

by the synapses to the passage of a nervous impulse. We have seen that, owing to the break in continuity of the nerve substance, which occurs at the synapses, a certain degree of resistance is encountered there. This resistance varies with the state of the blood, and the effect of fatigue upon the speed and efficiency of a given performance is an example of this physiological influence. This resistance is permanently lowered by the frequent passage of the same impulse and in this fact we see the basis of the formation of neural habit. One last word of caution may be given. The cerebrum functions as a whole and the body of the individual reacts as a whole. "The problem of describing cerebral cortical functions is therefore the problem of ascertaining how various parts of the cortex co-operate on a given occasion with all the parts of the body concerned."

The Vegetative Nervous System.—We have seen that the term nervous system includes also what is known as the vegetative nervous system. So far no account has been given of this section, and the state of knowledge about the workings of the vegetative nervous system is at present very incomplete. In view of our insistence that the reactions of the body are of the whole body it is clearly necessary that we should have some idea of the part played by the vegetative system. Moreover the trend of thought in modern psychology is to ascribe an increasingly important rôle to the functioning of the vegetative system more particularly in what are referred to as emotional states.

Briefly the vegetative nervous system consists in nerves going out from centres in the cord

and the medulla. There are three main divisions—

(a) from the medulla a branch which serves to stimulate digestion,

(b) from the middle part of the cord a branch which checks digestion, hastens the beating of the heart and is generally operative in those signs of disturbed activity which we associate with emotional factors,

(c) a branch from the lower part of the cord to the bladder and rectum.

Of these three groups the first and the last are subject to the control of the cerebral cortex, but the second is not. It is only the first and second groups which need concern us here. It is clear even from the above very brief outline that there is a certain antagonism between the functions of (a) and (b). Group (a) is sometimes referred to as the parasympathetic or autonomic system, and its fibres pass by way of the mid brain to the internal organs. The second group (b) is known as the sympathetic system. The names parasympathetic and sympathetic are given because in some text-books the whole of the vegetative system is referred to as the autonomic or sometimes as the sympathetic. It is necessary that we should at least realize the opposition in functioning of the parasympathetic and sympathetic systems. In our study of the reactive organs of the body we included the ductless glands. There is a growing conviction supported by experimental evidence that there is a close connection between the functioning of the endocrine glands and of the sympathetic nervous system. To the nature of this connection we must return later when we consider the nature of emotional

reactions with which also, as we have indicated, the functioning of the endocrine glands is closely bound up.

This then is the bodily mechanism by means of which the young child has to build up his experience of the world. A few connections are ready-made, but the list is, as we have seen, strictly limited. The rest have to be "built in" or learned. That a child learns by doing is a dictum with which every teacher is familiar. We may express this fact also by saying that every time a child reacts to a given situation he is influenced by previous reactions, and that his present behaviour will in turn affect his future activities.

REFERENCES

WOODWORTH. *Psychology*, Chapter III.

THOMSON. *Instinct, Intelligence and Character*, Chapters VI and XI

PERRIN AND KLEIN. *Psychology*, Chapter II.

CHAPTER VI

ELEMENTS OF THE LEARNING PROCESS

Range of Learning.—Learning and the school are held to belong together, and yet the most superficial consideration will show that only a small fraction of the activities we acquire is due to the agency of the school.

We have seen that the number of native reactions in the human baby is extremely limited. If, to the very small repertoire of unlearned reactions which we have considered, we add certain so-called tendencies to reaction, it yet remains true that the vast majority of our activities are acquired during our lifetime. They must then be considered as learnt and as such are the product of education. We rightly use the term to learn in ordinary speech to cover a very varied list of activities, and there is no ambiguity involved in such a use. We speak of learning in connection with bodily activities such as dancing and swimming, or again in reference to the body of instruction which we believe to be the peculiar province of school education and lastly we speak of learning in connection with moral growth. When, for example, we say that we have learnt self-control we imply that this virtue of self-control has been acquired by us after a more or less prolonged period of deliberate and often painful practice.

We have outlined briefly the bodily mechanism by which simple initial activities become co-ordinated. It remains for us to refer this understanding to those aspects of learning which may illuminate the procedure of teaching.

Continuity of Development.—We are accustomed to think of man as par excellence a learning animal. Sometimes we vaguely attribute this fact to what we think of as the superior intelligence of man. Leaving on one side for the moment the very difficult question as to what constitutes this superior intelligence, there are two points on which a preliminary emphasis must be laid. The first, which is self-evident, is that it is only because our native endowment in respect of complete reactions is so small and in respect of rudimentary ones so loosely organized that this great range of learning is possible. The second consideration is that all the complicated developments in action and thought, which we think of as characterizing the mature man, are nevertheless built up on these few simple native reactions and tendencies to reaction. If we keep this fact in mind we shall be less likely to fall into the very dangerous error of speaking loosely of certain forms of activity, as for example thought and reasoning, as if they were divorced from more humble varieties. It is for the teacher, in particular, essential that he shall view the child's development as continuous and progressive.

To emphasize this element of continuity many writers on educational psychology stress not only the progress from the child to the mature man, but also the essential continuity in development from the lowest forms of animal life to the highest. "In short",

says Professor Nunn, "stupendous as the distance is between the lives of the protozoan and the creature who has been made a little lower than the angels, it consists—like the difference between a village church and a cathedral—not in any radical unlikeness of the essential features but rather in the differing richness, variety and subtlety of the details in which a single scheme has been worked out at different evolutionary levels."¹

Animal Learning.—Most text-books of psychology devote one or two chapters to the discussion of learning in animals, in the belief that from the study of these simple forms of learning we may be able to deduce some of the laws which operate in learning of other orders. Before then we pass on to the consideration of the processes at work in what we think of as school learning, it may be profitable to consider the findings which have emerged from the many experiments which have been made on learning in animals. The subjects of these experiments have ranged from the simplest of unicellular animals to the higher apes. No attempt will here be made to give a detailed account of the different experiments. They are set out in full in the books mentioned below and make interesting and instructive reading. The first question which we must consider is as to what constitutes the simplest criterion of learning. We should, I suppose, agree that it consists in the modification of an original reaction as the result of experience. It may be that many presentations of the original situation are necessary before the modification is established, or it may be that the modification, if established, is not

¹ *Education: its Data and First Principles*, page 17.

permanently retained. In either case we are entitled to say that for the original, the animal substitutes an acquired reaction, that is to say he has learnt something new.

The stentor, a small trumpet-shaped animal, is found to make certain protective movements to avoid the presence of a harmful dye which is poured into the water in which it lives. Finally when all else fails he swims away. A spider who at first dropped quickly to the floor at the sound of a note on the tuning fork ceased in time to respond to a stimulus which proved harmless. A cat imprisoned in a cage with food outside succeeded after many random attempts in working the latch which opened the door of the cage. After a number of repetitions of the same situation he responded at once by making the correct movement. More complicated still are the maze experiments tried with rats. Food is placed in the centre of the maze, and after many false moves the rat succeeds in reaching it. Repetition of the experiment reveals a decrease in the length of time taken to reach the food. It has been found possible to plot a curve of learning to show the progress made by the rat.

The question which arises is, "What inferences of value can we make from the consideration of these experiments?"

The situations in which the animals were placed were such as to call forth, at first, mere random responses, but the necessity for some response was inherent in the situation. In most of the cases so considered the incentive to action was through the powerful appeal to hunger. We saw that the result of practice was to decrease the time taken to reach

the required objective and this in turn was secured by the elimination of false moves. Now two factors which would seem to have been at work are the effects of practice and more particularly of successful practice. These two factors have been incorporated by Thorndike into two laws of learning called respectively the Law of Exercise and the Law of Effect. Stated as definite laws of learning they lay themselves open to attack at many points, but it is sufficient for us to notice that the combination of practice with success is undoubtedly a prominent factor in securing rapid learning of any operation.

Successful Practice.—It is a commonplace of educational theory and practice that the child also must have a strong initial incentive for learning and that continued practice is a necessary factor in any learning operation. What is perhaps not always equally realized by the young teacher is the fact played by successful practice. Successful or partially successful efforts must be reinforced by judicious praise. It is not uncommon to find young students conscientiously critical of errors, but neglecting the converse appreciation of work well done. It is true that there are dangers in indiscriminate approval and in facile acceptance of very partial success. But it is the experience of the writer that there is a tendency amongst inexperienced teachers to fail to grasp the paramount importance of the influence of successful practice. We have seen that Thorndike has felt justified in laying down that successful practice apart from mere practice as such, is one of the most fundamental 'laws' of learning in animals. We may then feel justified in assuming that in the case of human beings

where awareness of success may be more acute the importance of this factor may be still greater. At this point it may be in place to remind the student of the value to the child of his own judgments of comparative success in his own work. This question touches on many points which must be reserved for future discussion. But one note may here be inserted. Much is written about the value in education of competition, sublimated in respect of games and lessons, into friendly rivalry. It is held that even in necessary but tedious branches of school work, where it is difficult to find a direct incentive in terms of the child's own spontaneous activity, the appeal to rivalry may act as a useful bridge. This is true, but it is probably equally true that more extensive and valuable results would be obtained if the child were encouraged to regard himself as his rival and to measure his own progress. Simple 'records of progress' can be kept by the child, and the pleasure he derives from improvement over his own previous scores is both greater and more valuable than that which results from superiority over others.

Incentive.—But our survey of animal learning and the possible correspondence with human learning is by no means complete. The reader will doubtless feel that the question of original incentive needs further elaboration. In the case of the experiments with animals outlined above the initial activity was in response to the powerful appeal of hunger. As Woodworth pithily expresses it: "Put a cat in a cage with a piece of meat or fish outside and you are sure to get action". Now clearly the child in school is not induced to learn through the appeal

of hunger or, generally speaking, in the hope of immediate tangible reward. The phrase "Rewards and Punishments" is a frequent chapter heading of books on educational theory and practice, and the purpose of such a chapter is to discuss the part which immediate rewards and punishments play in the life of the very young child, and the steps by which the child gradually progresses to what are believed to be higher motives. The teacher in school does not for a moment suppose that the child in school must be induced to learn by hope of reward or fear of punishment, and his object is to diminish increasingly the part played by either of these factors. Theoretically it is held that the word "induce" is altogether out of place in relation to the child and his activities. Modern educational experiments are based on the principle of what is known as free activity, and curriculum and methods are derived empirically from its spontaneous manifestation. The teacher in the public elementary or secondary school, faced with the handling of large classes and the administration of an imposed scheme, is restricted in the freedom of choice of incentive. It is a twofold problem. Admittedly learning is both quicker and more permanent in the presence of a strong incentive—admittedly also much of what is now considered necessary matter of instruction for the child born into modern civilization is removed from simple drives to action. The evolution of motives and the organization of pain and pleasure are intricate psychological questions with which the rat in the maze has, as far as we know, no acquaintance. At this stage, therefore, with the field of emotional development still unexplored, let us sum up provisionally

this important question of incentive. Activity is natural and necessary to the child; this activity is not haphazard, but is in direct response to stimuli received from the external world and from within the body. The number of stimuli to which the child will respond readily is very great, and by the time the child reaches school age the problem is not so much to provide a new stimulus to activity as to select from the number not only available but, as it were, clamouring for response. Neither is the curriculum of the elementary school haphazard, and although it is designed for the simultaneous development of thousands of children all possessed of marked individual differences, it is justifiable to assume that for the vast majority the interpretation of the physical environment in its various aspects will have its own appeal. Number, form, significance, are the basis of the fundamental subjects of the school course, and in respect of these the child's activity is already directed before he comes under the teacher's charge. School education aims at greater economy and efficiency in the interpretation of the environment, and provided that the process is not too arbitrarily short-circuited the necessary incentive is the child's need for the understanding and control of the world around him. We are accustomed to speak of interest as the great incentive. The teacher must consider interest as bound up with previous profitable experience and with a desired control which is still incomplete.

Further parallels between human and animal learning.—The situations which we have so far discussed in regard to animal learning have been of the type requiring a form of learning known as trial and error.

It is difficult to find exactly parallel instances in the field of human learning. The part played by language from the earliest years together with the organized verbal expression of past experience gives us a tremendous advantage over the animal in similar case. The maze experiment has been tried with children and with adults, and Woodworth gives a good analysis of the reasons of human superiority, of which by far the most important is the presence of what is designated as "insight into the situation". But before we turn to the discussion of what exactly is meant by "insight" let us try to find examples in human learning of some of the simpler characteristics which have been found in animal learning.

The object of a very simple experiment, but one which has been the subject of much controversy and which has been in part at least responsible for a definite theory of behaviour, was the "conditioning" of animals to react to a comparatively complicated substitute stimulus. It has been tried in various forms by different experimenters. A rat, for example, may be confronted by two openings, one covered with a yellow disc and one by a red, leading in the case of the first to food but in the case of the second to no reward. It is clearly a matter of apparent chance which the rat will enter first, but in the space of two trials he will reach the food. On a subsequent occasion it would be expected that the rat would run in the direction which previously led to the food, but if it is the experimenter's design that the yellow disc shall be the signal which will lead to food then, however much the discs may be interchanged, the time will come when the rat has 'learnt' this significant fact

and will be guided by the appearance of the disc irrespective of position. We say, in this connection, that the rat has learnt to respond to a substitute stimulus. While we may possibly feel surprise that an animal can so modify its behaviour we shall have no difficulty in finding similar examples in our own lives, and such examples in the case of the very young child have already been quoted in Chapter II. When, in a game, the child learns in time to react to the word "go" rather than to the initial stimulus of his own readiness we have here perhaps an analogous situation. But more important, because merely suggestive from the point of view of the teacher, is an extension of the above experiment, in which the discs are of the same colour but of differing degrees of brightness. If the two discs are originally of two shades of grey, which we may call A and B, then if B is the brighter of the two, the animal will learn as above to react to B. But now suppose that the experiment, learnt with A and B, is extended to cover B and C, in which C is brighter than B, then it is found that the animal will react to C rather than to B. This very significant result has given rise to various hypotheses and suggested interpretations. We may perhaps put it simply by saying that the animal has learnt to react to a stimulus which is not absolute but which depends upon a pattern of relationships. In our customary terms of thought we should be inclined to see here a "higher" principle of action. Whether we think of it as "higher" or not it is at least significant.

Rôle of Relations.—The understanding of the rôle of relations and of the growing intricacy of the pattern of stimulus and response is the key by

which many problems of learning in school and out of it can be best interpreted. We may think of the whole of life as a gradual evolution of a pattern which will vary with each individual, and, if we consider any one branch of knowledge, we shall see also that our progressive grasp of it corresponds to the working out of a pattern which, however intricate, is yet a complete whole. But at this stage, as we are dealing with very simple acts of learning, let us try to find a parallel illustration in the learning of the child. "In the early teaching of number we believe that a child's recognition of a "picture number" is helped materially by the "pattern" in which the constituents of the number are presented. Design rather than formless presentation is the aim. In the later teaching of number, when we come to the important principle of place values, it is the relative position of the digits which is emphasized as important, and the child must learn that while 5 may originally be thought of as greater than 3 yet if the two numbers are placed together in the form 35 the significance of the 3 is greater. It is an extension of this same principle of relative value which leads later to the estimation of an approximate answer.

Co-ordination of Units.—The rat in the maze behaves in a very instructive manner. Some of his responses are useless, he must therefore eliminate them. So the child in school learns to eliminate useless movements in drawing, writing and dancing just as in his pre-school days he learnt to eliminate unnecessary movements in walking. Reading, and addition of numbers gradually become more economical physical processes, and with this diminution of physical activity there

comes a correspondingly increased elasticity of application. Observations of the rat in the maze have shown also that he tends to group together his units of movement, to prepare ahead for a certain length of run which he has 'learnt' is the connecting link of two turns. If for example the rat is put down in the middle of a familiar maze instead of at the starting point his first run, developed to meet the first lap of the maze—may now bring him up sharply against a blank wall. We may compare this incident to our own mishap when, having prepared ourselves to descend yet another step, we find that we are already at the bottom of the steps. The "jar" we experience is a measure of the degree of muscular exertion which we had prepared. But though we are, like the rat, brought up from time to time against the effects of mistaken preparedness, it is clear that in general it is of great advantage to prepare our movements ahead. As the child progresses in learning to read so he looks ahead to the next word, the writer's thoughts are ahead of the word he is writing, the pianist in his execution is preparing for the phrase ahead of the one he is playing.

Effective Units of Learning.—Without further discussion of the factors displayed by animal learning of the type we have instanced we may perhaps at this point jump rather quickly to an extended application which is of the greatest importance to the teacher and child in their mutual exploration of learning. The problem for them both is to find the most effective units of learning. Simple original units of reactions become co-ordinated into higher ones which are at the same time more economical and more productive.

Experiments have been tried with human subjects on the learning of such a form of practical skill as the sending and receiving of telegraphic messages. First the operator learns to send and receive each letter separately, a slow and laborious process. Gradually the letters become co-ordinated into words, and words into phrases, and, as the higher units evolve so there is a corresponding increase in speed and efficiency. Reading and writing are for the child analogous instances. The phrase is the unit, and, in the case of reading, a small fraction of the written word will give us the clue to the significance of the whole. An objection may here be raised. A modern method of the teaching of reading called the "Look and Say" method emphasizes that the word and the phrase are the best initial units of learning. The reason for this is that they convey a meaning, that is, they are more closely allied to the child's experience and therefore more readily present themselves as centres of interested activity, than do the single letters. This is true, but the words and phrases so selected become the later basis of analysis and further co-ordination of the type we have instanced, developing gradually into really effective units for further work.

Effective Units in Arithmetic and Geography.—If we turn to the subject of Arithmetic it is both easy and valuable to try to interpret our teaching in terms of effective units. At an early age we try to ensure that the child shall think in terms of groups as well as in terms of single units. Counting in 3's, 4's, 5's is an excellent preparation for later work in the multiplication tables. When the child is faced with the intricacies of the English money table we encourage

them to "make up the shillings" as the addition proceeds, rather than to accumulate a vast number of single pence which must be laboriously "reduced" to shillings at the end of the process. Much later, in problems of percentages, we try to choose the most effective unit for each particular problem, and the success of graphical work depends obviously to a great extent upon the choice of a suitable scale.

If we turn to the teaching of Geography we find a similar principle in operation. The very young child learns in terms of the lives of people in a given area because to him the human unit is the most significant. But as he progresses it is the climatic unit which plays the most important part and which has superseded in modern methods the old political unit. The simplest unit for teaching purposes is often that which has the most universal and elastic application, and yet this unit is only arrived at after a preliminary investigation of others which suggest and lead towards the more profitable scheme.

The teacher in his preparation of work has frequently to take account of the fact that the most profitable "unit" is one which requires a considerable period of time for its exposition. His problem then becomes how best to subdivide his material in order to secure that the unit of the whole may be ultimately apparent. "The important point to notice is that the unit of teaching is rarely the single lesson confined to one period of a time-table. The single lesson is usually one step in a process, a step to be complete in itself and neatly rounded off, but to be regarded only as a link in a chain."¹

¹ *Approach to Teaching*. Ward and Roscoe, page 66.

Plateaux in Learning.—The teacher has his own ideas as to the degree of improvement which can be attained by a child in any specific performance of learning. He frequently finds that a child who has progressed well up to a certain point becomes for a time unable to make any further improvement. The reasons for this period of marking time may vary, but their diagnosis is obviously important. In the experiment on the rate of learning of telegraphists in sending and receiving messages this same phenomenon was seen to manifest itself. An interesting account is given by Woodworth (pp. 322-323) of the "flat places" or plateaux which occurred in the learning curve for the receiving process. It was found in many cases to be due to the fact that the operator had not yet passed from the simple letter unit to the more economical and efficient units of the word and phrase. It may mean that the learner is consolidating the lower before passing to the higher, or it may mean that he has not discovered the higher. A gradually achieved control of the higher units of action led invariably to a greatly increased speed and efficiency and the curve rose to what is called the "physiological limit" of performance. When a teacher discovers that a child is stranded on a plateau far below the attainable peaks he must then investigate the cause of the delay. It may be that the child is suffering from discouragement and from the lack of the stimulus of conscious successful practice or it may be that he is merely consolidating the lower units. But it will probably be found that the child, like the telegraphist, is in need of a more efficient unit of work and that the help of the teacher is required in this respect.

It is not difficult to find concrete examples of common occurrence in schools. How often does the teacher find that progress in Arithmetic is delayed through the child's failure to grasp the implications of factors and multiples. Much of the common difficulty experienced in questions on percentages may, in the belief of the writer, be due to the fact that the child is seeking for the formula which will express directly the relation of Selling price to Buying price, of population a year hence to population a year ago.

Reading and Writing afford still more numerous examples, and, from what has been said already on the subject of reading, it will be clear that the progress from the word to the phrase affords a close analogy with the problems of the telegraphist. It is not unusual to find a "plateau" in reading before fluency and understanding have become incorporated into a single unit. Difficulty in the mechanical process of writing impedes the fluency of composition. The teacher is often warned about a too rigid insistence on the "best writing" in early imaginative efforts at composition, and that laborious written statements may easily impair arithmetical accuracy. There is a stage at which much writing is a hindrance, rather than a help, to the child engaged upon other processes.

"Finally", says Professor Godfrey Thomson, "we should realize that many of us and many of our pupils are living contentedly on such plateaux, mere shelves in the upward sloping hill of progress, under the impression that we have reached the peak of our powers. It may not be worth while, but in almost any of our activities any one of us probably could,

if he wished and gave thought and effort to it, lift himself on to a new upward curve and reach a higher level of skill.”¹ It has indeed been found by direct experiment that the “physiological limit” recedes further and further under the influence of strong incentive. The psychologist who, taking a group of boys who had already reached a high level of efficiency in the mechanical process of arithmetic, promised a slight monetary reward for each individual improvement upon previously recorded efficiency, found that the strain upon his finances was unexpectedly severe and that the experiment promised to continue indefinitely. We are brought back again to those fundamental conditions of learning, strong incentive and recognized successful practice.

We may conclude this survey of some of the simpler factors of learning by a brief allusion to a recent suggestion which, while it may appear at the moment to be of merely academic interest, should, if established, have an important bearing upon the teacher's task. Professor Leary investigates the explanations given by different authorities as to the process by which the rat learns the maze. He himself brings forward a theory that since the reward follows upon the last movement, there is evidence for supposing that the rat “learns” the last move first, but that, if a reward were interposed after each successful move, then the steps would be learnt from first to last. He suggests that an investigation should be made into the school subjects which can best be learnt (a) backwards, or (b) forwards.

¹*Instinct, Intelligence and Character*, page 256.

REFERENCES

- Instinct, Intelligence and Character*, GODFREY THOMSON, Chapters V, VII, XXIV.
Psychology, WOODWORTH, CXIII.
Experimental Education, RUSK, Chapter XIII.
Modern Psychology and Education, STURT AND OAKDEN, Chapter XVI.

CHAPTER VII

SOME FURTHER DEVELOPMENTS OF THE LEARNING PROCESS

Continuity of Forms of Learning.—There is, to the teacher in general, at least a partial antithesis between the problem of understanding and that of the achievement of practical skill. He will agree that walking and dancing, writing and drawing, even talking and reading, are definite physical activities dependent upon the co-ordination of muscular movements. But he will argue that behind the reading and talking there is a knowing which is something different from the actual muscular effort involved. He may cite the familiar contrasts between the engine driver and the engineer, between the "mere mechanic" and the "designing brain". He is accustomed to speak of individual children in his class as on the one hand practical—on the other intellectual and to believe that in so doing he implies a contrast. He believes further that his task is to help the children to know and not merely to do, to develop something mysteriously alluded to as reasoning power. But if he is asked why he considers understanding and reasoning important he will reply that in virtue of these two activities the child will be able to live more fully, to do more efficiently, and in short to evolve a more significant pattern of life.

We have spoken of understanding and reasoning as themselves activities, and the fundamental principle of successful learning and efficient teaching is that there can be no divorce between knowing and doing. But it is not sufficient to do mere lip service to this truth. It is necessary to see more in detail how it is demonstrated in all behaviour, and how the educational policy of the school is shot through with its implications. There are two possible starting points from which we could undertake this investigation. One would be from the consideration of language, the development of which constitutes, as we have seen, one of the chief measures of superiority in human over animal learning. The other point of attack would be to concentrate for a little upon the receiving mechanism of the body, leading to the elaboration of sense experience. It is proposed here to adopt the second plan because it has long been a commonplace of educational theory and practice that all knowledge is ultimately based upon sense experience. The work of Comenius, and of Pestalozzi and his followers was derived from this fundamental principle, and in modern times the interpretation given to it by Madame Montessori is familiar as its most far-reaching expression. "Perception", says Sir Percy Nunn, "the earliest of intellectual activities, is the key by which all the rest may be understood."¹

Sense Training.—In Chapter V we outlined the various sense-organs of the body and showed how the popular conception of five must be extended. For the purposes of education we are accustomed to consider the organs of sight and hearing as of pre-

¹ *Education : its Data and First Principles*, page 182.

dominant importance, but we know that the practice of the Montessori School attaches an equal fundamental importance for educational purposes, to the sense of touch. The exploration of the world by the young baby is conducted largely through the medium of touch. It is by this instrument that he begins his discrimination of objects in regard to position and form. If we read any account of Madame Montessori's educational work in so far as it deals with discrimination in respect of position, size and shape, or in reference to the value of touch in connection with the learning of hand-writing we meet the phrase "muscular memory"; and this usage raises two important points. In the first place we have seen that the muscles are reacting organs, and this will serve as a reminder that sense experience is a complex unit culminating in a definite reaction. Our senses are assailed by stimuli on all sides, but it is the selective reaction which is the important factor of our experience. In the second place we are reminded of the kinaesthetic group of sense-organs situated in the muscles and connecting tissues which, stimulated by movement, provoke in response a greater delicacy of adjustment. The attempts of the child to reduce to order the external world in respect of the two features of position and size owe much to the combination of tactile and kinaesthetic responses. It is the recognition of this truth which underlies the practice of the Montessori Schools.

At this point it may be useful to consider the meaning of the phrase "sense training" which occurs in so many educational writings. It must not be taken to imply that we can by practice improve the physio-

logical functioning of the sense-organs. The phrase is apt to be misleading, but it embodies the recognized truth that it is good for the child to have, in his contact with the world, a wide background of sensory experience calling out its typical response. We must repeat that it is the reaction which is important not only for its immediate value, but as a constituent factor in subsequent reaction patterns. When we speak of sense discrimination we are, in reality, referring to the greater variety of reactions which will be called forth by the corresponding variety in stimuli. Delicate discrimination of sounds, colours, touch and movement is not only of definite utilitarian value, but is an integral part of aesthetic appreciation. It can only be attained through activity in regard to these varieties of sense experience, and it is the task of the teacher to provide for the child those situations which will enrich his equipment of meaning.

We regard the tea-taster, the musician, and the artist as individuals who have developed discrimination in respect of taste, hearing and sight to a degree not reached by the ordinary man. The expert can distinguish in his province a slight degree of significance imperceptible to the layman; and we, who admire this superior diagnosis, often feel that with adequate training we could ourselves have reached a higher degree of perceptive ability. It is for the teacher of young children to provide a full sensory background, and for the teacher of all children to develop to his "physiological limit" his own power of recognition of the nature of the difficulties both intellectual and emotional which affect the individuals in his care.

Sense Perception.—The result of discrimination may

issue in muscular activity or in spoken words. It would be better perhaps, since the spoken word (or even, some hold, the thought) is itself a muscular activity to distinguish rather between overt adjustment of the body and talking. We touched lightly in Chapter IV upon the first beginnings of speech in the child. Many books have been written upon the development of language both in the race and in the child. Records have been kept of the vocabulary of young children; and the proportions of the different parts of speech which occur in them have been calculated. For the moment we will concentrate upon the simple utterance of the child in which he gives a name to what he sees. The name of an object is arbitrary and must be learnt. We gave in Chapter IV an account of Watson's experiment in which he 'conditioned' his young son to respond to the sight of the feeding-bottle by the word "da-da". Assuming that there has been no such deliberate tampering with the education of the child in speech we are rightly inclined to regard the child's ability to recognize and to name as a sign of growth. We know that the young child is apt to economize his names and to group together under the same name objects which we have learnt to discriminate one from the other. We ourselves are limited in discrimination of those objects with which we are only partially familiar. Only the expert can distinguish one kind of aeroplane from another, but even those of us who do not drive a motor-car are learning with experience to know by their appearance different makes of cars, while the enthusiastic schoolboy can often distinguish them by sound alone. Let us now consider the implications

of a simple phrase such as "I see a bird". Even the least psychologically equipped will admit that this phrase represents a dovetailing of two experiences — 'I see a sight and I know that it is a bird'. I know it because I have been taught to respond with the word 'bird' to this particular configuration. Such a response is called in psychological language —sense-perception. The stimulus has become charged with meaning as the result of previous experience, and so in sense perception we "respond to the stimulus by knowing something about it". According to Woodworth we must regard perception as a secondary response following on the primary response of sensation.

It is not necessary in a book such as this to describe in detail the process known psychologically as sensation. In connection with the exteroceptors we rarely get a pure sensation since from our own experience we read into it some form of meaning. Perhaps the nearest approach is the vague reaction we give to stimulation of the visceral sense-organs. We speak not incorrectly of a sensation of hunger or of unpleasantness, and it is difficult to be more specific. But our response to stimulation of the sense-organs of sight, hearing and touch is continually being modified by experience. There is a modern school of psychologists, who, in their efforts to purge the science of obscurity and from the accumulation of abstract terms, deplore the invocation of the term "meaning" to cover unexplained contingencies. But when we say that in sense perception the stimulus has become charged with meaning we do not after all imply any mysterious agency, but assert simply that as the

result of repeated reactions to the same stimulus certain motor and language habits have become fused. Viewed from the physiological standpoint we know that such fusion is accomplished by the bringing into play of the association areas of the cortex of the brain.

We are here considering what is called the "perceptual level" of cognition or knowledge, that is the stage at which there is "awareness of and response to objects in the sense world". As we have said above, our perceptual response to the same stimulus undergoes many changes as we proceed from childhood to adult life. Even when we are grown up we do not always diagnose correctly our perceptual response to a stimulus. We may, for example, mistake the noise of a heavy fall for that of thunder, or the back-firing of a motor-car for a pistol-shot. During the war we frequently misdiagnosed a certain type of noise as an air raid. We misread the number of an approaching omnibus and mistake one individual for another. Such errors in perception are instructive. We may say that when we are confronted with a certain pattern we supplement that pattern subjectively from our previous experience. Sometimes we do it deliberately, as when we see pictures in the fire and in the frost tracings on the window, sometimes apparently half unconsciously we supplement the pattern to fit in with our organized wishes, and often we are unwilling to yield to the further scientific evidence which destroys our premature generalizations.

We may then consider that out of the association of stimulus and reaction, more or less often repeated, there grows a certain pattern reaction, sometimes

referred to as a "schema" which is roused into activity as a whole when we are confronted with an appropriate stimulus. From this angle we view perception as the "dynamic apprehension" of a pattern. A situation partly new and partly old will thus result in a slightly modified reaction, from which will issue for future occasions a "schema" at once amplified and more elastic.

Generalized Pattern Reactions.—If sense-perception is indeed the key by which all intellectual activity must be understood then we must expect to be able to trace from its origin those so-called "higher" forms, which we include under the terms reasoning, thinking and imagination. When the child first comes under the care of the teacher in school he is not expected to indulge in abstract reasoning, or to be able to profit by precept divorced from practice. In the early days of child-study experiments were undertaken to discover the so-called contents of children's minds on entering school. It was customary to refer to the number of concepts which the child had at his command and to regard this number as an index of his stage of development. The tendency of modern psychology is to deprecate as far as possible the use of abstract terms, such as "concept" in the belief that they lead to an unfortunate divorce between forms of activity. But the meaning implied by the term "concept" is an important one for the teacher to understand.

If we examine the drawings made by young children of a man, we notice that they are very much alike. The children have observed many men and reproduce in their drawings what appear to them to be the

essential characteristics. The result may from the artistic point of view be hopelessly inadequate, but to the child it represents unmistakably a man. It expresses what may be called the child's concept of a man. Such a concept is clearly not the result of trying to combine in a single drawing the characteristics of all the men with whom the child is familiar. It is equally incorrect to assume that a psychological concept is a composite result obtained by grouping together a class of objects. It is rather the outcome of the elimination of the inessential and the emphasis of the essential features of the class of situations which are relevant. When a concept is formed its value lies in its being a useful condensed formula to guide reactions. That is why we rightly regard the ability of a child to give a name to a situation as of great educational significance. One method by which it was hoped to discover the number and clearness of the concepts which a child had at his disposal was to ask for the definition of some common name. Most young children, for example, will define an object in terms of its use as "a chair is to sit upon" and we can easily see that as a beginning of understanding this is the natural selection to make. We can incidentally note how the child insists upon the importance of action in connection with his background.

The use of adjectives by the child is regarded as a great forward step in the formation of concepts. It is a comparatively late development and there would appear to be little evidence of adjectives being used before the third year of life. A young child who can apply the adjective "round" equally to a flat penny

and to a spherical ball has clearly made a relevant abstraction of a comparatively high order. Professor Spearman quotes the case of the small boy who was taught to distinguish between two cans of water, one hot and the other cold, and who later at dinner pointed to a steaming pie and a jug of cold water, and without touching them repeated the adjectives "hot" and "cold" in correct association. There was little similarity in appearance between the jug of hot water and the pie, but the child had abstracted the one common feature of steam and it was to this abstracted quality that he responded with the term "hot".

Professor Spearman goes on to say: "Under analogous (though not often so favourable) conditions children learn that certain things are 'good' or 'bad', 'sweet' or 'sour', 'round' or 'square', 'pleased' or 'angry'. In the beginning the process may still be called perceptual, but soon, as is proved by increasingly dexterous manipulation of adjectives as such, the child becomes able to think of the characters more and more separately from the objects which they characterize." ¹

Application to School Curriculum and Teaching Methods.—It is between the ages of seven and twelve that the child gains gradual facility in generalization. He ceases to be engrossed in particular instances and becomes able to compare and contrast and to formulate certain general laws. From the educational point of view it would therefore be apparent that the curriculum before this stage is reached must be based on concrete practical situations rather than upon abstract principles.

¹ *Nature of Intelligence*, page 267

Application to School Organization and Curriculum.—There is at the present time a movement in administrative circles towards a cleavage in the child's educational world at the age of eleven. The grounds upon which this division is urged are many, and are grouped together under the two headings of psychological and vocational. We may understand under the first heading factors which determine both the intellectual and emotional development of the child. We have so far dealt with some aspects of the learning process in respect of the child's growing control of environment, and we have emphasized the essential unity of action and thought. The use of the term intellectual must then be understood in a wide sense to include the developing hierarchy of reaction patterns, the complexity and delicacy of which correspond to what we are accustomed to think of as meaningful interpretation.

The question which we must now ask ourselves is, "How do the curriculum of the school and the methods of teaching children up to the age of eleven reflect the lines along which this development takes place?" A study of the curriculum of the elementary school from the time at which education was made compulsory until the present day reveals an expansion which in turn reflects the more liberal interpretation of the child's needs. On the one hand we have the position of Reading, Writing and Arithmetic still strongly entrenched as the essential elements, but on the other hand we have practical subjects, physical training and the beginnings of the humanities. The curriculum has become many-sided in the hope that so the child may be deprived of no profitable avenue

of approach, but may establish as many contacts as possible with the world in which he lives. The problem for the teacher has become correspondingly complicated. His task is to preserve as far as possible the unity of these different approaches and to ensure that the child, with the instruments at his command, shall progress towards real control of his environment.

Let us glance first then at one of the so-called major subjects. Number and form may be regarded as the two fundamental instruments of order. We see them as necessities in the elimination of chaos. So the teaching of Arithmetic is occupied initially with the distinction between numbers and between groups, leading to calculation and notation and with the need for a standard of comparison leading to exact measurement. It is insisted that the child's ideas of number can only be profitably built up on a concrete background and we are familiar with the different types of apparatus designed to meet this need. We work in the early stages through sense-perception in the belief that by so doing we give meaning to otherwise abstract symbols. But we are working also towards the stage at which the symbols cease to be bound up for the child with particular objects or with special visual presentations; we are working towards a "concept" of number, that is to say, towards the establishment of a precise but elastic reaction pattern free from the trammels of particular instance. But it is important for the teacher of Arithmetic to realize that while his belief in the value of these free "schemas" is well justified, their utility is equally dependent upon the child's realization that while it is economical not to have them too closely bound up with particular

situations, they are in actual fact consonant with the data of the external world.

The knowledge of their basis in fact must never be lost sight of in the progress towards so-called higher abstractions. The superiority of boys to girls in Arithmetical attainments may in part be due to their interest in those branches of mechanical construction which lend reality to calculations. But it is not difficult for the thoughtful teacher to secure that in the teaching of Arithmetic to girls interesting links with reality are also brought forward.

The successful teaching of decimal fractions depends upon the realization by the child of the principle of place value upon which our number system is based. It was at one time considered that decimal fractions should be postponed until a comparatively late stage of the school course and should follow on a complete treatment of vulgar fractions involving complex applications of the four fundamental rules. The present tendency is to introduce the beginnings of decimal fractions at a much earlier stage, and to treat them as a natural extension of a principle already grasped. The first lesson on decimal fractions is generally introduced by a revision and emphasis upon the principle of place value, and in particular upon place value dependent upon a basis of ten. It is not uncommon to find in such a lesson that children who have for three years worked correctly calculations dependent upon this principle yet find difficulty in estimating the relative value of the digits in such a number as 3,333. But it is equally true to say that the elucidation of this generalized principle is to the children concerned a valuable piece of work, which

not only prepares the way for further work but illuminates and enriches what has gone before. We have here an instance of what we may call a point of culmination in arithmetical experience. In the beginning the child is taught to differentiate upon a concrete basis groups of ten; this initial differentiation is transferred to paper in the form of separate columns for different denominations. But when the child has reached the stage of formulating the principle of place value he has clearly acquired a general elastic pattern which can be stretched at will to right or left.

The subject of Arithmetic affords an easy and prolific source of examples of progress from the perceptual level of particular instances to generalized formulæ. But the same principle may be seen at work in any other subject. We have talked a little already about the stages by which the child learns to read and we have discussed his progress in talking and in acquiring the significance of words. We know that the beginner considers the formation of the visual symbols as a whole, but that, as he progresses, only a small part of the presented form suffices to touch off the response as a whole. Further, when the child reads with "expression" he is clearly introducing elements dependent upon his own previous experience. "The reader reacts not to the mere visual shape but to its acquired significance" . . . says Mr Fox in his *Educational Psychology*, and he concludes his chapter by adding that the "best introduction to the study of educational psychology is to be found in an examination of the steps by which a child learns to read",¹

¹ *Educational Psychology*, page 54.

And this power of so interpreting the written word that, to its generalized significance, is added the further restricted implications imposed by its context may be taken as an adequate illustration of how we may fling into a particular situation a general pattern and add to it a particular reinforcement. As a last illustration we may perhaps refer to the reading of maps. A map is essentially an embodiment of general formulæ which can be applied with equal success to territories of any size. We interpret the symbols in respect of the feature—distance—direction—relief—production which is relevant to our particular purpose. The child who makes a plasticine model, or who draws to scale a plan of the class-room is working at the perceptual level from which the symbols of the map will emerge as elastic, generalized patterns to be applied at will.

In the previous chapter we suggested that one problem of the teacher is to find in the different school subjects the most effective units of learning. In the light of our present survey of the growth of knowledge from the perceptual level we may perhaps feel that the truly effective unit which will eventually both economize and enrich the learning process is that which provides for the child the material from which he can derive a body of working processes which will eventually become general principles.

Preperception and Apperception.—It is not necessary that either of these terms should become part of the vocabulary of the young teacher, but it is necessary that he should be familiar with their implications in so far as they affect his work. The term apperception is rapidly falling into disuse for reasons which

we need not discuss and the term preperception has not a wide circulation. But both refer to the truths already enunciated that present perception is influenced by past experience, and that wealth of cognate material enriches the concept formed. There are well-known devices by which the teacher seeks to vivify his presentation of a lesson. Illustrations and experiments are part of the teacher's stock-in-trade, but he realizes that the mere presentation of an illustration, or performance of an experiment does not in itself of necessity further the progress of the lesson. In order to obtain the greatest value from these devices the teacher must help the child to observe, must direct his attention to the salient features, and must supply him with the necessary language in terms of which the observations may be best recorded. We often hear the phrase, "training in observation", used loosely, and such an expression is to be regarded with a caution equal to that which we have found necessary in respect of so-called "sense training". But it is undoubtedly true that children must be trained to observe those objects which we present to them for the purpose of illustrating our own instruction. In his interesting account of the experiments he conducted with university students, in which a series of lantern slides shewing types of armour was followed by a questionnaire on points observed, Mr Fox brings forward conclusive evidence to show the influence on the results, of previous preparation and instruction as to the names of the various features portrayed. His conclusions are equally applicable to the use of illustrations in school subjects, and may be quoted in part.

"It is evident that the chief effect of preperception is to introduce order into the observation and that technical terminology is only of assistance provided that it is thoroughly well known." "The observer feels that his mental energy is being more effectively spent and this tends to make him feel more active. Such effective use of mental effort is accompanied by a distinct feeling of satisfaction which seems to make the effort easier."¹

The teacher, then, must see to it that the observation of the child is directed, that his attention is focussed upon the salient features and that he has at his disposal the language necessary to record his observations.

REFERENCES

- WOODWORTH. *Psychology*, Chapter XVII.
THOMSON. *Instinct, Intelligence and Character*, Chapter XII.
C FOX. *Educational Psychology*, Chapters II and III.
STURT AND OAKDEN. *Matter and Method in Education*, Part II, Illustrations.
EDGEELL. *Mental Life*, Chapters VI and VII.
RUSK. *Experimental Education*, Chapters V and VI.
NUNN. *Education, its Data and first Principles*, Chapters XIII and XIV.

¹ *Educational Psychology*, page 71.

CHAPTER VIII

AIDS TO CONSTRUCTIVE WORK

IMAGERY AND IMAGINATION

Recapitulation.—In our discussion of the learning process our emphasis has so far been on two important points. They may be briefly summed up once more. We must remember that the child's first responses to sense-impression are in terms of muscular activity, that they are at first exploratory in character and fall to a large extent under the category of trial and error behaviour. Secondly, as experience of similar situations develops, so the responses become modified and more adequately adapted for successful dealing. Improvement or learning is signified by the building up of a variety of organizations ready to be brought into play as occasion requires. Correspondingly, the teacher's practice, in so far as it claims to be based upon scientific principles, can also be summarized under two headings. He realizes the value of motor activity and seeks to provide the child with the concrete situations which will evoke as economically as possible the required response. Secondly, he endeavours to clarify and give precision to the child's activities, to connect them as far as possible into allied groups, and to ensure that they shall be ready to function as a unit when required. He makes his teaching concrete, he illustrates by reference to the child's own

life, he enlists the support of the child's active interests and having built up an organized body of knowledge he throws upon the child the task of its application.

But no reference has so far been made to imagination and memory, and little has been said about thought and reasoning. We are accustomed to look upon these activities as mysterious agencies, the peculiar property of the human species, to spell their names with capital letters, and to regard the cultivation of them as amongst the principal aims of the educative process. And yet the truth would appear to be that they are only branches of the main stream of activity, and that their evolution has been from the simple forms of reaction we have so far described. If we try to understand them in the light of our preceding discussion, we shall not be tempted to minimize their importance but shall perhaps avoid the dangers of unjustifiably isolating elements of experience.

Imagery and Imagination.—We do homage to imagination, and we think of it as connected with, but superior to, another process which is known as imagery. In our discussion of sense-perception we saw that it involved a certain degree of supplementation from past experience. Such supplementation may take the form of what is known as an image. There is a simple phenomenon known in psychology as an after-image which gives us the clue to the understanding of imagery in general. If a bright light is switched on in the room in which we are, and, after an interval of time, switched off again we still "seem to see it" in front of us for a few seconds. This is explained in physiological language by saying that the response dies away more slowly than the stimulus which

produced it. But when we speak of imagery in general we mean something more far-reaching than this 'lag of response'. We speak of "seeing with the mind's eye" such an object as a tree even though there is no tree in front of us. Similarly we "imagine" the sound of thunder, the smell of hay, the taste of tea, the feel of velvet, or the movement of marching. This reaction to a stimulus which is not apparently present to the senses, we speak of as an image. If we try in turn to get an image corresponding to each variety of sense-perception we realize that some are easier than others. Generally speaking, visual and auditory images are clearer than tactile or olfactory. People appear to differ very much in the type of imagery which predominates and in the vividness of the images which they can produce. The experiment of Galton, in which he asked his students to form images of the breakfast table, is a familiar illustration of the wide range in vividness of visual imagery, which will be found among any non-selected group of people. A similar difference will be found among a group of people who record the imagery suggested to them by reading a given extract of poetry or prose. Even if the extract selected is one well calculated to present "pictures" to the reader all will not react to it in the same way. This difference in power and type of imagery is obviously important in the investigation of educational methods.

Imagery in Children.—Text-books on psychology and education frequently point out that while children are predominantly visualisers a certain number rely chiefly upon auditory images and that the teacher in his methods of instruction must provide for both

types. While, for example, the presentation of a time-chart in History may be of great help in giving the child a clear conception of relative periods of time, there may be others who will appreciate this proportion more easily through the spoken voice and to whom the recital of dates may be of assistance. There may also be a small proportion who rely upon kinæsthetic imagery and who will interpret the procession of History in terms of an imaginary march in space. The teacher is urged to make use of imagery as an instrument in the learning process, and sometimes one meets in text-books such precepts as "cultivate the power of imagery". It is believed that as the child grows older the vividness of imagery declines. Experiments made on children have borne witness, in some cases, to an apparently most acute power of visual imagery. In one experiment a picture was presented for a few seconds to a group of children. There was much detail in the picture, and the length of exposure was thought to be not sufficient to enable the children to memorize all the details portrayed. After the picture had been removed a questionnaire involving details of number, colour, and position was presented to the children, and the answers were in some cases so far correct as to provoke the explanation that the children had as it were consulted the "image" which remained after the picture had been withdrawn. Imagery of such an acute nature is referred to as eidetic and would appear to differ little in vividness and clarity from the actual sense perception. The interpretation of such experiments is open to dispute, and the whole question of imagery is one of controversy. There are those who refuse to

see in imagery anything more than incorrect and incomplete perception, and there are those who believe that the memorizing process is sufficient to account for the phenomenon of eidetic imagery. The ultimate solution of these problems would have an important bearing upon the educator's task, but pending that solution he may well pay attention to certain points. He must above all beware of attributing to imagery a mysterious nature. An 'image' is aroused by some form of sense perception—the spoken word, or the visual impression, and it constitutes a response of the same nature as sense-perception, though differing in vividness and completeness.

Eidetic imagery of the type described is practically unknown amongst adults, and imagery in general appears to decline as the child grows older. We say 'appears' to decline because the ascertainable facts point to the conclusion that it is rather a yielding in place of visual and auditory imagery to what is known as verbal imagery in which the words themselves are sufficient symbols of the reality behind. For most of us the visual image of a scene which we call up is a mere apology in vividness and wealth of detail for the original sense-perception. The question at issue for the educator is whether such a decline should be regarded as an avoidable catastrophe. The answer would appear to be that it is unavoidable, and that it is not a catastrophe.

The Value of Imagery.—What, if any, is the particular value of imagery? An image is generally defined as an ideal representation or as the apprehension of an object in the absence of the object itself. But it is based upon some form of sense per-

ception which acts as a partial stimulus to secure the same motor adjustments as occur in sense perception itself. The value of an image is that it enables us to make experimental responses before committing ourselves to any definite form of overt activity. Suppose for example you are asked to direct a motorist from Charing Cross to Paddington. You are not able to answer as does the policeman. "First to the left, second to the right" and so on with mechanical precision. You would see a picture of the two stations and the roads in their immediate vicinity, and, more gradually, the middle of the picture is filled in. Then you appear to direct the motorist in terms of an imaginary map. But if you were asked to give the same directions on many consecutive days, there would come a time when you could emulate the policeman's precision, and the rôle of the image would be correspondingly diminished.

What then is the position of the young child, and how does the image come to play a progressively smaller part? By analogy with the instance which we have quoted above we should expect to be able to trace the part played by the image in exploratory processes. We may perhaps say that the chief function of the image in school-work is to give greater vividness to situations in which the actual sensory content is lacking. In particular, in narrative lessons children will supply the gaps by imagery, provided always that there has been in the past adequate sensory experience on which the image is based. Thus, waving cornfields, snowy mountains or stormy seas reproduced in imagery give added appreciation to history, geography and literature. It is of course

in connection with the appreciation of literature that the value of imagery is most frequently extolled. Professor Godfrey Thomson points out that even isolated items of vocabulary are enriched when their enunciation is accompanied by appropriate imagery. "Let us", he says, "turn first to the pleasure which a habit of imagery brings into the words of our every day vocabulary. Nearly every word we use imprisons a picture which imagery can release. . . . Most of us only too soon come to use the words as counters without concrete imagery, a tendency which brings to some the power of generalizing and abstract thinking, but which brings to a greater number only verbosity and parrot faltering fluency."¹

How much more, it may be argued, will the meaning of connected passages in prose and poetry be enriched by the images called up—whether they are visual of sights suggested, auditory of sounds remembered, or kinaesthetic, recovering movement and rhythm. And this is no doubt true, provided always that the images are true and arise spontaneously. There are nevertheless certain cautions which must be entered against the too enthusiastic attempt to stimulate imagery which does not easily arise. Experimental investigation into children's imagery has revealed that they contain a large proportion of what is referred to as a "subjective element", that is to say, they are based upon items of past experience which are not really relevant to the present situation. Most of us are now able to laugh heartily at the imagery suggested to us as children by the lines of familiar hymns. "A study of children's imagery", says

¹ *Instinct, Intelligence and Character*, pages 90 and 91.

Rusk, "will help to chasten the teacher's opinion as to the importance of the school in education. Life, we are often told, is the best school and wisdom keeps school out of doors." He goes on to say, in reference to the part played by imagery in appreciation of literature, "In literature where the imagery is not essential but merely enriches or develops the thought, strong imagery is often a positive hindrance to interpretation. In dealing with such literature the teacher should therefore not exert himself to develop the imagery of the piece by explanation or emphasis until after the interpretation has been completed by the pupils."¹ To many adults it is doubtless true that the words alone carry their significance, and that literary appreciation rests ultimately upon this.

Having entered then this word of caution in respect of too great enthusiasm for a laborious evocation of imagery, we may return to other aspects of school learning in which imagery has an undoubted utilitarian value. It is only necessary to allude in passing to the part which imagery plays in memorizing. The image of a particular part of the printed page has saved many of us from disaster in recitation of poetry or of events. The pianist and the typist rely largely upon imagery for success in their performance, and it is suggested that kinaesthetic imagery has a share in skilled bodily activities such as tennis playing or dancing. This last suggestion recalls to us the rôle allotted to the image as an instrument in experimental activity. In this connection we may in conclusion refer to the value of imagery in the solution

¹ *Experimental Education*, page 113.

of problems in Arithmetic and Geometry. We speak frequently of envisaging the situation, and this phrasology itself suggests the presence of imagery. Those problems which require the time taken by trains to pass each other, and, more usefully, those dependent upon shadows, and heights and distances, call essentially for a visualization of the position. It would be an instructive exercise to classify those problems in Arithmetic in which imagery is called for. At a somewhat higher level than pure trial and error, or concrete representation, it serves to supply a need when words and symbols are insufficient. The symbols of Mathematics, the notes of music, the words of language as recorded on paper become ultimately adequate representations of the situations they describe. A movement has recently been made towards the establishment of a notation of dancing in which the symbols shall stand for movements. It would be interesting to speculate on the kinaesthetic imagery which will be called up by such a notation to one who is learning the significance of the signs used.

Imagination.—We might strictly speaking expect that the verb 'to imagine' would denote merely the reactions we have just described under the heading of "imagery". But in current usage, as we are well aware, the connotation of the term 'imagine' has been widely stretched. Imagery, as we have discussed it, would appear to have little relation to the claims of imagination and its output in art and literature. The recognition of the value of the products of art in its several spheres has led us to exalt "the imagination" which we believe to have produced them, and to see in it some mysterious 'faculty'

which must by all means be cultivated in the children under the teacher's charge. It will avoid future confusion and loose thinking if we, at this stage, endeavour to free ourselves from the obsession that imagination is a specially designed faculty of mind, and concentrate rather upon the meaning which we wish to express when we use in common speech the words 'to imagine'.

We shall admit, at the outset, that we mean, as in the case of imagery, an experimental activity with objects which are not present to the senses. The 'image' however would seem a dull and lifeless phenomenon in comparison with the scenes which we imagine. It will be suggested that flights of imagination are concerned with elements which are new. Thus, if we imagine ourselves to be famous as film stars or channel swimmers the scenes of triumph in which we play the leading rôle have not in fact any counterpart in the actual progress of our own life. We alter our own physical features, our abilities, and the impression which we are accustomed to make upon others. The reasons why we make these changes are significant, but at the moment let us concentrate rather on the mechanism of the picture we have produced. If we dissect it we find that no single element is in itself new, but is based upon actual experience. What we have done is to combine the elements in a personal way to produce a picture which is itself new. We should then agree that an imaginative picture of this nature may be truthfully described as a new combination of old experiences.

It may now be contended that by an extension of

what we may prefer to call wilful destruction the highest work of art may be so disintegrated into elements of commonplace imagery, but that the ability to combine these elements into a work of art is itself an indication of an individual imagination which is something much greater than any activity of mind or body which we have so far discussed. Let us agree that the co-ordination is unique, and that the ability to effect it varies from individual to individual, but let us prefer to see in it rather a special pattern of relationships than a mark of an isolated faculty. The nature of the pattern will depend upon a complexity of factors, embracing the nature of the individual's make up and the whole of his past experience. But let us not forget that the process of imagining reduces itself to a regrouping of elements, and to the apprehension of an extended chain of relationships.

Novels of Phantasy.—There is a species of novel of which the best example may be sought in the works of Mr. H. G. Wells, which is marked by an apparent divorce from life, as we know it. In such a book we feel entitled to say that the author has drawn on his imagination. But we used the phrase apparent divorce deliberately because analysis brings to light the fact that while the book as a whole is incompatible with ordinary life, the ingredients are yet derived from actual experience. The author has arrived at his complete phantasy by a reversal of relationships and by a new combination of elements. The rôle and nature of the process of building up relationships is fundamental to the understanding of the growth of cognitive behaviour. But for the

moment it is only necessary to emphasize the point that the wildest flight of fancy must have its basis in sense-perception.

There are times when we are content to imagine ourselves back in some previous phase of our life. We do not attempt to re-combine the elements but, in the hope of renewing some past pleasure, try to live again through some particular sequence of events. We should not claim that imagination used in this connection was anything more than merely reproductive. It is customary to find a distinction drawn between what is called on the one hand reproductive and on the other constructive imagination. Such a contrast has its value, but it is important for us to remember that no effort of imagination is without its reproductive element which is in turn based upon actual sense-perception.

Varieties of Imagination.—Another distinction which is sometimes drawn, notably by Dr James Drever, is between æsthetic and pragmatic imagination. Æsthetic imagination is the type which finds expression in works of art. Its distinguishing mark is held to be its freedom from restriction, and the end sought that of purely emotional satisfaction. We have seen above that even æsthetic imagination is by no means free from restrictions, but in the sense that the ultimate aim is independent of immediate concrete circumscribing factors the distinction can be understood. Pragmatic imagination, on the other hand, is held to be subject to an immediate objective control. Its expression is to be looked for in the field of scientific achievements in invention and construction. The most devout believer in the supremacy of imagination

will be heard to admit that the inventor who designs the tank for use in warfare, or the statesman who finds a formula to reconcile conflicting interests, is gifted with imagination, but he will distinguish them by claiming that in such cases the end of imaginative effort is laid down at the outset. The result, however unexpected, must yet fit in with the world of physical fact as we know it; it must, that is, be congruent with reality.

Imaginative Activity of Children.—The discussion of imagery arose in connection with the supplementation of a percept from past experience. The function of an image has been defined as to make past experience available for present use. Its importance in educational practice is therefore clear. The significance for the educator of the different types of imagery, and the means by which they can be usefully employed have been to some extent discussed. But what are we to say of the wider claim that education must "cultivate the imagination"? In the light of what has already been said, the first criticism which will arise is that to speak of "the imagination" at all implies a misunderstanding of the process in question. But if we seek for light as to what exactly is meant by this oft-repeated phrase certain facts emerge. The first is that those who urge us to cultivate imagination in children have in view partly the future appreciation of art, partly the more adequate "self-expression" of the child, and partly no doubt the possibility of escape from the limited reactions of everyday routine. The field of imaginative effort is held to be a fundamental part of "complete living", and those who can enter actively into this field will find a wider range

of enjoyment and an enriched individual life. In this view we must entirely concur.

It will be well, however, in the interests of practical methods to try to state the problem more baldly in terms of the scientific conception by which we have tried to interpret individual behaviour. What we want the child to do is to be able so to enlarge his reaction patterns, and so far to free them from particular attributes as to be able to relate them to new situations however diverse. We shall then do well to remember that this will be impossible unless the child starts with an adequate background of sensory experience. The imagination of a child cannot be cultivated by asking him to imagine himself in a series of situations which are quite outside his own experience. Anyone who has endeavoured to bring the children of a slum district into contact with the wonders of country life by means of a class-room lesson will bear witness to the difficulties which will be encountered.

The writer once heard an enthusiastic teacher of some experience give a lesson on a mouse to a class of young children in a school in a very poor neighbourhood. Her preparatory question as to possible sources of noises in the night met with such varied responses as "the trams outside" and "the lady upstairs", but did not embrace the comparatively minor audible activity of the mouse. The choice of subjects for composition which is sometimes given to children in school reflects an inability to realize the essential connection between imaginative effort and experience. Rusk argues that the imaginative activity of the child is mainly reproductive and imitative and draws

the conclusion that "Education should consequently seek to secure that imagination is based on adequate analysis of objects of perception and that it is subordinated, through training in attention and judgment, to perception and recall both in observation and in testimony."¹ The examples which he quotes in an earlier part of the book of some of the misconceptions of children discovered by experiment, as for example that butterflies make butter, are illustrative of the need for caution on the part of the teacher in assuming too wide a background for imaginative constructive work on the part of the children.

It is useless and incorrect to diagnose resulting failure as due to lack of imagination on the part of the children. The all-important fact is that children can only imagine by reference to what they know from experience. As their range of apprehension increases and their patterns and schemas become more effective and less tied to particular situations, then only will it become possible for them to achieve profitable contact with situations of which they have had no direct experience. The task of the teacher in reference to imagination is then briefly to fill in the necessary items of the relationship scheme. The first tasks in imaginative constructive work must be such as are based upon the actual experience of the children and require only a regrouping of familiar experiences. A later development might consist in exercises in which, the relationship being given, the child is given the task of 'educing' the final situation. The completion of a story of which the first part only is given is an example of such an exercise, and

¹ *Experimental Education*, page 120.

at a more advanced stage the construction of a drama of which the characters are given.

It is by such means that the child proceeds to constructive creative work in any department, and to the appreciation of the creative efforts of others.

Make-Believe.—There is another aspect of the question of imagination which must be touched upon here. We refer to the general controversy as to the advisability of encouraging make-believe in children and as to the possibly harmful effects of fairy-tales. This difficult problem can best be considered later when we have dealt more fully with the factors which affect the child's emotional development. A few points may, however, be made here. Make-believe is a natural feature of child life—the product of make-believe is however determined by the child's present experience. We recognize that there are dangers in carrying this practice too far into later life, since it is apt to serve as an escape from the adequate facing of real problems. We wish for the child a life in profitable contact with reality, and it is a sound doctrine that his constructive efforts should from the earliest years be employed upon concrete material. It is in our power to supply the child with this concrete material on which to employ both 'pragmatic and æsthetic' imaginative construction. But if we recognize the genuine inferiority of the child in face of an, as yet, very partially understood environment we shall be the less likely to condemn his flights of phantasy. The facility with which a child can adapt the most humble instrument of play to the most imposing purpose is evidence of the need he feels to rid himself of impediments in order that he may have

a clear field for self-assertion. Sir Percy Nunn sums up the situation. "According to this explanation the child's habit of make-believe does not imply that he prefers his fantasy-world to reality. It is merely a biological device to secure that his self-assertion during the formative years of life shall not be frustrated by his inability to control the real conditions of his activities. We should expect therefore that as age brings fuller knowledge and completer command of these conditions, the make-believe element would diminish in importance. And that is precisely what we find."¹ It is in short only when there is reason to believe that make-believe is interfering with the progressive grasp of reality that the teacher or parent has cause to feel alarm.

REFERENCES

- WOODWORTH. *Psychology*, Chapters XIX and XV.
THOMSON *Instinct, Intelligence and Character*, Chapter IX, X.
STURT AND OAKDEN. *Modern Psychology and Education*, Chapter XIII.
EDGELL. *Mental Life*, Chapter IX.
NUNN. *Education, its Data and First Principles*, Chapter VII.
RUSK *Experimental Education*, Chapter VIII.
FOX. *Educational Psychology*, Chapters IV and X.

¹ *Education, its Data and First Principles*, page 83.

CHAPTER IX

THE PROCESS OF REMEMBERING

Influence of past upon present experience.—The survey of the learning process which we have so far undertaken has emphasized throughout the paramount importance of the influence of past upon present experience. It is indeed the fundamental postulate in virtue of which alone learning is possible. We have seen that animals low in the scale of evolution give evidence of the retention of past experience and of consequent improvement in present performance. The superior ability of man in learning has been attributed, amongst other causes, to his organization of language, which enables him to express in words the elements of comparison and contrast between the situations with which he is confronted. It is of course more particularly in reference to these spoken expressions of past experience that we are accustomed to use the terms 'memory' and remembering. But in the light of our preceding discussion it is clear that the marks of retention can be seen equally in any form of muscular activity.

But a further complication is introduced when we reflect that we are often unaware of the influence which past experience is exerting upon present behaviour. When the psychologist tells us that we are

what we are at the present moment only in virtue of every past moment of our lives we should presumably all admit that in some vague way this may be true.

We may go even further and admit that we at the present moment are the result not only of our own past life, but of that of the whole human race from its earliest beginnings. It is perhaps extraordinary that the burden of this does not lie more heavily upon us. "Why", we may ask, "are we not at this moment weighed down by the incubus of this past of millions of incidents, which however trivial they may have appeared to us yet seem to be of momentous import?" To this question we might add another: "Where exactly is secreted in our own person the impress of this past?" So far from being weighed down by the past are we, we may assert, "that at this moment we cannot even remember half of the content of our life of yesterday or even of an hour ago".

Use of Term Memory.—But 'memory' as it is used in common speech appears to be something much narrower than this vast idea of the influence of the past upon present experience. Let us consider three ordinary types of assertion which may be encountered on any day. 'I seem to remember that face', 'I remember that I have an appointment at three o'clock', and 'I remember that William the Conqueror landed in Britain in 1066'. In these three statements are included varieties of mental activity which, while they may with justice be grouped under the heading of 'memory', are yet by no means identical.

'I seem to remember that face.' That is to say, I am inclined to believe, although the evidence is not at the moment forthcoming, that this particular

face has figured before in my experience. With this belief in my mind I make an effort to 'recollect' as we say the circumstances of this previous encounter. I may or may not be successful in doing so, but one thing is certain: as I proceed with my self-imposed inquiry, hosts of associations come crowding into my mind the existence of which I should have said unhesitatingly a moment ago had been completely forgotten. If the effort of recall is successful I have a feeling of satisfaction apparently quite disproportionate to the importance of the incident. If on the other hand not all my seeking can recapture the vanished scenes, then I am aware of strain and uneasiness. So does an elusive tune haunt us. At one moment it is almost on our lips—at the next it has vanished. We are unable to turn our attention to other things, and when at last it springs complete to our mind we feel a real pleasure and relaxation. Where was the tune—where was the face? We could not place them, but we knew that they too left a trace somewhere in our organism and that our task was to connect up this mark with present experience.

This takes us back to our starting point. Here at random we have found two experiences—one a face once seen, the other a piece of music once heard. They presumably left an imprint, but it never troubled us until something in our present experience stirred it. This then is the theory. No experience in our life is too trivial to leave behind it a permanent trace—it may be a physiological modification of the brain or of nerve traits—known as an imprint or an 'engram'. This engram modifies the previous existing disposition of the organism and in particular it becomes associated

with others having common elements. One of the most potent common elements in the grouping of these traces is believed to be the feeling or 'affect' which attended the original experience. Our attempt to recall the original experience may be considered as a working backwards along the association lines, and when at last we become aware of the initial event we say with conviction that we remember it.

'I remember that I have an appointment at three o'clock.' At some moment in my past life then I made this appointment and it is this action of mine in the past which now maintains its modifying influence on my present activities. Between the making and the keeping of the appointment I occupy myself with many things to which I devote my 'attention', but the condition is always present that my intermediate activities may not be inconsistent with the determining tendency set up, when, at one particular moment I agreed to a certain course of action at three o'clock on a future day. It is my awareness of this action of mine in the past when deliberately I circumscribed my future movements which constitutes what I call my 'remembering that I have an appointment'. Sometimes it is true I forget that I have an appointment. Does this mean that my action at the time of agreeing to the appointment left no trace behind it? We should readily agree that this is not the case. More complicated processes are here at work. Often we can recognize that it is the opposing course of our present interests which prevents us from keeping the appointment—in short that we do not want to keep it—and even when we do not recognize it, and exclaim with horror that we are utterly unable to

account for our failure—the psycho-analysts tell us that it is still true that we did not want to do it. But it is not germane to our present discussion to pursue this train of thought further.

‘I remember that William the Conqueror landed in Britain in 1066.’ Quite clearly this particular landing on British shores never formed part of my own experience, and the influence which this event undoubtedly exercised upon my personal life would yet never have provoked the assertion given above. But the explanation is obvious, it will be claimed. You were at some time in your life told of this event, and what you ‘remember’ is the result of the imprint left behind by this experience of being told. This explanation, clearly a true one, serves to throw still further light on this elusive problem of memory. ‘Memory’, says Professor Spearman, ‘consists in the recognition of the past as such’, and when we make an assertion such as the above it implies that at some time in the past we have as it were given our ‘assent’ to the information.

From this preliminary discussion certain points have perhaps emerged. They may seem elementary and even obvious, but the recognition of them is indispensable if we are to have any understanding of the ‘memory process’. Psychologists to-day prefer to talk rather of the processes of remembering and forgetting rather than of ‘memory’. There is a danger that we may imagine ‘memory’ as some mysterious entity or ‘faculty’ with which we are endowed. To the question ‘What is memory?’ it would be difficult to give a satisfactory answer except perhaps that as a thing ‘memory’ has no existence.

But to the question 'What is known about our remembering and forgetting?' it may be replied that some laws are at least surmised in the light of which these complicated processes may be to some extent elucidated. Starting from the axiom that all our experiences leave behind a trace, we may proceed to the next point. There are some things which apparently just happen to us, and as we say familiarly leave little impression upon us. We shall now concede that they do leave some impression, but what we mean is that we are not at the time aware that they have any determining influence on the course of our conscious life. We therefore 'forget' about them. Subsequent events may lead to their recall as we saw for example in the illustration of the forgotten face. We are therefore driven to the explanation that the memory traces left by such events since obviously they existed, must have survived subconsciously. The validity of the assumption of their subconscious existence has been argued by opposing schools and much work has yet to be done in this field. Some such hypothesis seems to be the only one in terms of which an explanation can be couched, but the problems raised by it are difficult ones.

Memory in Learning.—Let us turn now to those activities of our life which we pursue with the knowledge of their future bearing, or, which we may say that we wish to remember. Such activities will include all that we try to learn—whether it is a form of practical skill or the acquisition of mere information. Here 'to remember' is to our advantage, 'to forget' disastrous. We are wont to deplore the fact that we are born with a poor memory, and driven to what we

call adventitious aids to memory. We welcome perhaps with avidity the advertisement of a new 'Memory System' which will remove our disability. But the psychologists tell us that 'memory' in the abstract can never be improved, that we are born with a certain innate retentiveness which is a physiological mechanism reaching its maximum efficiency of functioning at a comparatively early age. This would appear to be a discouraging statement were it not that on investigation it is found that it does not imply that we cannot help ourselves to remember particular events provided always that we want to remember them, and that we are prepared to incorporate them into a well-consolidated whole.

Memorizing as one aspect of Memory.—After these preliminary observations we may then turn to the question of what it is that the teacher most wishes the children in his class to remember and by what means he can best secure this result. The first point which will emerge is that he must not identify memorizing in the sense of learning by heart for the purpose of verbal repetition with the large issues involved in the remembering process. Woodworth in his treatment of the subject of memory distinguishes four aspects which he calls respectively

- (a) memorizing or learning
- (b) retention
- (c) recall
- (d) recognition.

In regard to the first of these four divisions he remarks. "Observation we found to be of great assistance, both by way of hastening the learning process, and

by way of making what is learned more available for future use. Our previous studies of learning thus lead us to inquire whether committing to memory may not consist partly in rehearsing what we wish to learn and partly in observing it. Learning by rote, or by merely repeating a performance over and over again is indeed a fact; and observant study is also a fact."¹

It would appear that the process of memorizing differs little from those aspects of learning which we have hitherto discussed. The need for practice and the value of organized perception have already been emphasized. The value of the former lay in its conducing to greater speed and accuracy in the performance of the task, in the breaking down of resistance, and in the approach to an habitual type of reaction. Organized observation, discussed under the heading of preperception, led to greater appreciation of meaning, and to a more coherent grasp of the whole. This in turn implied a closely knit association with relevant facts, and the influence of such association upon subsequent recall is obvious. In the previous chapter we alluded to the possible rôle of imagery as an aid to remembering, because it is associated with the significance of the task, and the importance of meaning is the fundamental factor on which the teacher must constantly rely in any operation in which successful remembering is sought. This is equally true whether he is dealing with a line of thought, a sequence of events, or with the verbal memorizing of lines of poetry or of multiplication tables.

¹ *Psychology*, page 333.

This being then agreed upon, the next problem is to discover in what ways the factors of meaning and practice may most profitably be brought together. Certain experimental evidence is available on this subject. The student is referred to the comprehensive account of such experiments and resulting statistics given by Woodworth in his chapter on Memory. All that is attempted here is a brief resumé of some of the results which are notably pertinent to the teacher's task.

Immediate reproduction versus permanent retention.—Many experiments have been devised with the object of discovering for example the most expeditious and advantageous method of attacking a piece of poetry which we wish to learn. Here we must distinguish between the two aims of reproducing immediately that which we have learnt and of being able to reproduce it at some future time. The latter is clearly the more permanent process and requires the more complicated machinery for its establishment. For the testing of immediate reproduction experiments have been carried out with a view to ascertaining at what age in children the power of memorizing for immediate reproduction appears to reach its maximum intensity. We are all familiar with the extent to which the meaning of a passage read will help in the process of memorizing it. A single sentence of say twenty syllables can be reproduced by adults after once hearing it with little effort. If however instead of a coherent sentence we heard twenty meaningless syllables, it is clear that the task would be much more difficult. The introduction of nonsense syllables into memory testing has eliminated the important factor of meaning,

and has so helped to discover some laws which apparently cover the power of retentiveness for immediate reproduction. The main result of such experiments appears to be that this capacity grows slowly and is much greater in adults than in children, but that after the age of twenty-five no further improvement is in general shown. What then becomes of the theory asserted so often that the 'memories' of children are superior to those of the adult?

We are able now to recite little poems which we learnt as children, and have had no opportunity for relearning, and yet if we try to reproduce a speech from Shakespeare which we in a moment of enthusiasm committed to memory in recent years, our efforts are disappointing in their result. We see that here a different problem is at issue. When we were the subjects of the nonsense syllable experiments the test was in the power of immediate reproduction. Now it is a question of delayed reproduction or of permanent retention and it is in this respect that children would appear to possess their real superiority. The results of experiments worked out on these lines suggest that in respect of retentiveness, capacity increases up to the age of twelve.

Forgetting and Recuperation.—It is important to bear in mind that what we forget is at least as important as what we remember. The two processes are part of one whole, and they are grouped together under the technical heading of 'Reminiscence and Obliviscence'. It is clear to all of us, that forgetting is an indispensable accompaniment of all our experiences. That is to say apparent forgetting, for we saw that

much which we imagined ourselves to have forgotten could under the necessary stimulus be recalled. We touched very lightly upon the question of the influence of the 'wish' upon forgetting and realized that here we were in the province of what we may agree to call the subconscious mind. But in the very concrete and definite matter of learning for example a few lines of poetry we should at first sight appear to be far removed from these somewhat mysterious influences. But there is a theory, strongly supported by experiments that even here in this concrete sphere there is evidence of strange recuperative activity on the part of the memory process.

We are well accustomed to the fact that after waking in the morning from a refreshing sleep we find that we can remember more of some particular topic than we could before falling asleep on the previous night. This phenomenon we are accustomed to ascribe lightly to the healing influence of sleep working on previous fatigue. But it appears that there is more in it than that. Ebbinghaus, the introducer of 'nonsense syllables', performed several experiments on the time taken to relearn a series of such syllables, after intervals varying from twenty minutes to a month or more. As was to be expected a saving of time in the relearning was remarked after the intervals, and so some idea was arrived at of the proportion of material forgotten in successive intervals.

But the most interesting and illuminating experiment in this direction was that performed by Dr Ballard upon elementary school children in London. The children were given a poem which they had never seen before and were allowed a definite time for learning

it. They were then required to write out as much as they remembered. After an interval of two days during which the children had been given no opportunity for relearning the piece, and were not expecting any further test, they were asked to write out again what they remembered. The results were significant. The average number of lines remembered at the second testing showed an increase of over ten per cent. on the previous results. Impressed by these results the experimenter tried a similar experiment on more than 5,000 children, of different ages, and allowed different intervals of time between the first and second repetition—the same batch of children never being retested more than once. Every care was taken to eliminate complicating disparity of circumstances. With children between twelve and thirteen years of age he found that for intervals of up to three days' duration there was a gain, but after this a loss in the amount remembered. The maximum gain however with this age group showed itself quite clearly to be after an interval of two days. With younger children of from five to seven years of age a greater degree of improvement was seen, and in this group the interval which gave the maximum reminiscence was three days. It is not necessary to enter here into the actual statistics involved, but one aspect deserves notice. The improvement shown at the second repetition did not consist simply in additional lines remembered. Let us suppose for example that at the first reproduction ten lines were written out correctly and at the second twelve; of these twelve lines perhaps eight would have appeared in the first reproduction, and thus four lines had in

the intervening time been recovered. In this hypothetical case, using the technical language of the psychologist, we should say that eight out of ten or eighty per cent. represented the actual retention of the amount originally reproduced, and two out of ten or twenty per cent. would represent the improvement, while four out of ten or forty per cent. would represent what is called the reminiscence, and two out of ten, twenty per cent. the obliviscence.

Reminiscence is defined as an improvement in the capacity to revive past experience. The opposite process of obliviscence, or the deterioration in the capacity to revive past experience, is a phenomenon with which we are unfortunately only too familiar. It is then comforting to reflect that we may possess a counter asset in the form of recuperation. 'There is', says Dr Ballard, 'a strong tendency towards oblivion in unrevived memories, but there is a counterbalancing tendency towards reminiscence'. Our comfort is however not very permanent, for he points out that it is a tendency which seems to disappear with age and of which little trace can be found in adults.

Units of Memorizing.—It is necessary now to refer to other experiments the results of which clearly have an important bearing upon the teacher's task. One of the fundamental questions which must be answered is "What is the most effective unit to be taken?" If we consider the familiar case of the learning by heart of a piece of poetry we shall see at once that there are different ways of attacking the task. Few teachers of to-day would, however, resort to the one-time popular method in which the children

learnt one line at a time. The disadvantages of this method are at once obvious. A line of a piece of poetry is very rarely a unit of progressive thought. To attempt to detach it destroys the meaning of the piece, and we have already seen that comprehension of meaning is the first essential in successful memorizing. What in fact is the practice of the teacher of to-day in this respect? The poem is read through as a whole several times, the meaning is discussed and the children are encouraged to answer questions, using the exact words given in the poem. This is generally followed by a dissection of the poem into verses each of which is regarded as a learning unit. The first part of this practice, concerned as it is with the consolidation of meaning, would appear to be wholly sound. As regards the second, there is some controversy. There is experimental evidence to show that with adults at least the most successful results are obtained by treating a poem of reasonable length as a whole, and by making each repetition consist of reading the whole. A certain amount of scepticism will no doubt be felt by those who have never tried this method of learning. A caution must here be added. When we spoke of the most successful results being obtained by this method we were speaking, of course, in terms of permanent retention. Before considering the application of this method to the treatment of children we may inquire in what precisely its advantage is supposed to lie. The answer is quite briefly in the preservation intact of the meaning of the whole, and in the avoidance of wrong associations. Most of us are familiar with the experience of stumbling for the first word of the new stanza in a poem which

we have learnt in bits. If it had been learnt as a whole the flow of associations would obviously have been uninterrupted. But when we come to consider the case of young children two objections are at once suggested. The first is that this method is discouraging to children. Incidentally we may emphasize at this point the great value of reproduction in all aspects of memory work. It is always helpful to know how much we know. In the case of a piece of poetry then, it is clear that this frequent recitation can only occur if the poem is learnt in parts. How then are we to reconcile the claims of the 'whole method' of learning with this undoubted fact and with the second objection which may now be urged, that the child is not capable of assimilating a long poem as a whole. The last objection may be met by saying that the unit of learning should be as large as the child's "power of apprehension" permits. That this is larger than the commonly accepted unit is very probable. It is for the teacher a matter of experiment to determine for the children in his charge the most profitable units of memorizing. But when the subject matter has thus been subdivided it is essential that each section shall be associated with the preceding section before the next one is attacked. So the danger of faulty association is minimized. The method which is known as the Progressive Method is a compromise between the part and the whole methods and consists in progressive consolidation of the sections learnt.

There are, however, exceptions to this rule. In the case, for example, of the multiplication table we wish to avoid at all costs the repetition of the whole table in order to arrive at one desired item. In this case

each item of the table is itself a unit and must be grasped concretely by the child in his early building up of the tables. It is necessary that the recognition of a product shall be immediate, and to secure this result memorizing is essential. But the teacher will be well advised to avoid as far as possible the parrot-like repetition of the table as a whole with its dangerous risk of wrong associations, and to concentrate upon the natural association of one item of the table with the ones immediately preceding and following. In the same category could be placed the learning of vocabulary in a foreign language, and the learning of dates in history, although in the last-named example the process will rather be to fit the isolated dates into a wider scheme based upon the continuity of historical events.

Intervals of Practice.—We are indebted also to experimental evidence for valuable results bearing upon the most profitable lengths of periods of practice, and on the most advantageous intervals between such periods. Here again the results in some cases would appear to be contrary to average expectation. We are accustomed to think of periods of intensive practice following one another at rapid intervals. Few of us would have the courage to read through once or twice a long poem and not return to it for two or three days. And yet it is along these lines that the best results in the case of the adult would appear to be achieved. With the child a compromise is again necessary, but our discussion of the phenomenon of recuperation in children has suggested that here too an interval of a few days is far from destructive. With children the periods of concentration are of

necessity shorter, and so will be the intervals between repetitions ; but it remains true with them also that the best results are achieved by distributed repetition. Woodworth summarizes the factors which operate in favour of whole versus part-learning, of spaced versus unspaced repetition and of the possible combinations of these methods. His conclusion is that while interest and emotional satisfaction would appear to be on the side of part and unspaced learning, yet the factor of meaning would appear to outweigh these in strength and to incline the balance towards whole and spaced learning. There is, however, a marked difference in individuals in this respect, and it is unwise to lay down universal laws. Permanent retention depends largely on physiological factors, and since nerves and muscles need recuperation in periods of rest the advantage of spaced repetition would be emphasized on this account. At the same time these physiological connections will not persist at equal strength unless they are exercised ; hence, we see the necessity for periodic repetition of those forms of skill which we wish to preserve intact.

In conclusion we may once more stress the fact that remembering in all forms of learning is essentially the same process. In some activities it may apparently be confined to muscular movements, in others apparently to spoken words, but it is more probable that in all, language, (whether spoken or not), and muscular movements both play an important part. Verbal memory follows the same lines of development as do other habits. Understanding and practice, interest and incentive are once again the determining factors. We have not found a golden

road towards the development of a perfect memory, but we have at least seen that when we lightly use the words 'I remember', we are alluding to the results of a highly complex process.

REFERENCES

WOODWORTH. *Psychology*, Chapter XIV.

EDGEELL. *Mental Life*, Chapter IX.

THOMSON. *Instinct, Intelligence and Character*, Chapter XXIV.

RUSK. *Experimental Education*, Chapter VII.

CHAPTER X

REASONING

Position of Reasoning in the scale of Activity.—We have alluded in a previous chapter to the danger of exalting imagination so that it becomes divorced from the more humble constituents of sense-perception from which it derives its stability. A similar caution was emphasized in respect of the tendency to regard memory as an isolated faculty. We saw that the processes of imagination and remembering may best be understood as forms of experience continuous with the more simple varieties, and that their influence may be seen in widely differing activities. What, then is to be our attitude towards reasoning which is exalted into the position of supremacy in the hierarchy of human reactions? It is held to be the peculiar attribute of man, and to mark his first distinction from the animals. Research workers in the field of intelligence, of which we shall take account in the following chapter, have found that reasoning ability correlates most highly with the hypothetical factor of 'general intelligence'. In scientific research we see embodied the results of reasoning, inductive and deductive. These results are adapted to the practical requirements of medicine, industry, and communication, and the amenities of our present

civilization are in general traceable to the productive reasoning of individuals in the fields of science. Mathematical reasoning is regarded as one of highest expressions of this activity because of the universal validity of the conclusions to which it leads. In the sphere of moral conduct, reasoned rather than impulsive behaviour has received the approval of man-mind presumably because it is believed to conduce to a more harmonized existence. The visible results of reasoning in practical life and the universal esteem for its employment in more abstract channels would appear to justify the position accorded to it in the scheme of activity.

On the other hand we are reminded by psychologists that reasoning may be sought in activity at the lowest as well as the highest levels, while the recent researches of Köhler into the behaviour of apes have led him to assert that the chimpanzee no less than the human being solves a problem by 'insight' which is akin to reasoning. We shall then be well advised to see in reasoning a form of activity which does not spring ready-made to the ultimate control of our experience, but which from lowly beginnings develops slowly into a more commanding position. The processes required for its functioning must, like the other forms of activity which we have considered, undergo the common development of extension and integration. Reasoning must be regarded not as an isolated faculty but as the culmination of certain simpler forms of experience.

Definitions.—If we plunge straight away into the difficult question of a definition of reasoning we find many from which to select in authoritative text-books. We read for example that 'to reason is to perform

an ideal experiment'. Sir Percy Nunn, who quotes this definition of Mr. Bradley's, amplifies it by saying, "In the higher types of intellectual activity the connection between cognition and action becomes so subtle that it needs careful analysis to bring it to light, but it can always be detected if the inquiry is pushed deep enough."¹

We may quote also the words of Professor Drever, "Reason is not a new force entering mental life from without at the higher levels. At the lowest levels the life and behaviour of the organism is co-ordinated, but the co-ordinating factor is not conscious of itself."² And again, "It is sometimes difficult to distinguish reason from understanding. This may be done by taking reason to be involved whenever the thought is consciously and deliberately controlled by the thinker with reference to a conscious end".³ From Woodworth we get the outlines of a distinction between imagination and reasoning, "Imagination differs from reasoning in being manipulation rather than exploration—reasoning consists in seeing relations that exist between facts—imagination in putting facts into new relationships".⁴

The Elements of Reasoning.—What elements then may we extract as the essential accompaniments of reasoning? First of all we must recognize the primary rôle of relationships. This rôle is a dual one. Relationships existing between given facts have to be observed, and one or other of these relationships must be applied to produce the required conclusion. If these pro-

¹ *Education, its Data and First Principles*, page 161.

² *An Introduction to the Psychology of Education*, page 28.

³ *Ibid* page 205.

⁴ *Psychology*, page 484.

cesses have been to the mind of the actor genuine reasoning processes, then the conclusion bears a stamp of unquestioned validity. Elimination and selection are inevitable, and are controlled with reference to the end desired. While reasoning is exploratory and in this sense leads to a new product it is at the same time rigidly controlled by limitations of material and by relation of time and space. This control is exercised not only over the interim processes of reasoning, but also over the conclusion reached. This also must be bounded by the facts and stand superior to assault from any quarter. As to the nature of the end sought in reasoning, Miss Edgell distinguishes between the problems of finding a cause and finding a consequence. So we reason about the probable events which led to the behaviour of one's friends on a given occasion, and we may reason, perhaps too late, about the probable consequences of our own behaviour on another occasion. Reasoning in the sphere of human relationships is perhaps the most difficult of all since the relevant considerations are apt to be elusive and have not that quality of stability found in mathematical symbols. An element of emotion is, moreover, likely to upset the true balancing of relevant factors. Prejudice is held to be inimical to the progress of reflective thought, and the personification of reason is cold, superior and powerful. On the other hand we achieve the 'reasonable attitude' in the face of personal difficulties, but we regard it as an acquired ingredient rather than as an initial force in emotional response. Reason in the sphere of conduct is dependent upon complex factors embracing emotional attitudes and what are technically called 'sentiments', which we shall have

later to discuss, but reason in the service of knowledge is more easily understandable in respect of its mechanism and functions. It is the most powerful aid to constructive work in the understanding and control of environment. The definition of reasoning as the performance of an ideal experiment bears out the exploratory nature of the process, calls attention to the purpose for which the experiment is undertaken, and suggests that the materials used are thoughts or images rather than concrete materials. We must in the sequel consider the progressive nature of the materials upon which reasoning is employed, but for the moment we will emphasize the experimental side of the activity. The constituents of an experiment are an original trial and error performance from which springs a possible basis for further work known as a 'tentative hypothesis'. This hypothesis is then treated in different sets of relevant circumstances, and if it holds is considered as proved. Once established, the conclusion serves to link together a certain group of facts into a recognized system, bound together by a relationship of which the investigator is aware. He condenses it into a formula in words or symbols, and in turn uses this formula as an instrument for testing further sets of conditions which he believes to be cognate. We hear much of the distinction between inductive and deductive reasoning. We associate induction with a generalization arrived at by examination of data, deduction with the application of an established formula to the confronting circumstances of the problem in hand. The reasoning required in the problems of the class-room and in life demands in general both varieties, and it is not necessary to dis-

tinguish too closely between the two. 'For the teacher', says Professor Godfrey Thomson, 'two things about reasoning seem to me of prime importance. The first is that the traditional division of reasoning into inductive and deductive reasoning is dangerous in the class-room because real thought must necessarily use both intermingled. . . . The second is that the ordinary processes of reasoning, either inductive or deductive, are comparatively easy matters to grasp, and are commonly used correctly by all but the least intelligent. It is rather the degree of abstraction and complexity in what is reasoned about which makes reasoning more or less difficult, and the care with which its results are tried and verified which makes it accurate.'¹

Examples of Reasoning.—From this discussion of the elements of the reasoning process we must now turn to its application in problems of real life and of class-room instruction. The mechanism is perhaps seen at its clearest in certain forms of tests, specially devised for the testing of reasoning ability in relation to general intelligence. The subject of intelligence testing in general will be treated in the following chapter, but we may here select one or two examples which bear directly upon our discussion of reasoning activity.

There is a simple form of Intelligence Test known as the Analogies test. An example would be

The day before yesterday : The day after to-morrow ::
 Tuesday : ?

The subject of the experiment is required to fill in

¹ *Instinct, Intelligence and Character*, page 259.

the missing term. In order to do so he must first estimate the relation in time between the first two terms of the analogy, and having found it apply it to the third term Tuesday in order to arrive at the new term or correlate. Let us take another example from the reasoning tests compiled by Dr Burt. It is given as a test for children of fourteen years of age and is as follows, " John said, ' I heard my clock strike yesterday, ten minutes before the first gun fired. I did not count the strokes, but I am sure it struck more than once, and I think it struck an odd number '. John was out all the morning from the earliest hours and his clock stopped at five to five the same afternoon. When do you think the first gun fired ? " The child reviews each part in relation to the whole situation, eliminates inapplicable alternatives, and having thus arrived at the relation required he applies it to the first statement and arrives at a new fact, namely the time of firing of the first gun. This problem differs only in complexity from the problem given to children of seven in which, from a list of available presents, they are required to select the one most suitable for a particular member of the family given a list of his tastes and pursuits.

In our previous discussion of the learning process we have tried to emphasize the importance of relationships and patterns at all stages of experience. The ability of the young child to give the name ' dog ' to a spaniel and an Alsatian alike is taken as a proof that he has both an organized pattern of the concept of a dog and also that he can use this pattern in relation to a new variety. But evidence of such ability may be sought in action as well as in speech. A young

child wishes to reach a pot of jam from a shelf in a cupboard which is beyond his reach. He climbs first on to a chair and finding this step also inadequate he fetches a hassock, places it on the top of the chair and so achieves the requisite height. We may ask, 'What difference is there other than in the symbols employed between such a procedure and that of the architect who in his designs introduces a buttress here or a strengthening there to give the support required, or that of a mathematician who manipulates one side of the identity to make it equal to the other?' The motorist who adjusts his steering to meet the exigencies of a threatened collision, the scout who uses his knowledge of compass bearings to obtain his objective, and the orator who tries to convince you that the time is now ripe for a revolution, are all employing the same procedure. They recognize a relationship, and apply it to present conditions to produce a definite result.

In such examples there is a conscious end in view; and reasoning with concrete material, words, or more abstract symbols is employed so to manipulate the material as to bring it into the position required. We use the same principle, employing relations of time and space, when we adjust the details of a heavy day's programme involving journeys from one place of call to another. Often we call in reasoning to help when memory fails as in the familiar experience, quoted by Woodworth, of trying to remember where an umbrella can have been left. In the absence of an encyclopaedia or high authority the investigation of causes of natural phenomena involves us in a train of reasoning activity which brings us into touch with

lines of scientific investigation. We are familiar with the expressions of childish curiosity beginning with "why". The enlightened parent or teacher contrives to adjust play material so that the simpler principles of mechanism can be understood. We rightly speak of the child's play with the 'meccano' as constructive because in it he is employing simple principles understood in the service of more complicated problems which he himself devises. The pleasure which the child derives from such manipulation may not unjustly be called pleasure in reasoning with concrete material in the service of a desired end. It may be compared to his experimental activity in the infants' school with the formal apparatus provided for training in sense-discrimination.

Progress in Material and Growing Power of Generalization.—The chief feature of the child's reasoning at this level is that it relies principally upon muscular activity in relation to perceptual material. It is clearly more economical and efficient when the stage is reached at which relations can be expressed in words. We have seen that language is itself symbolic, and as the child's mastery of speech matures so the constituent words of his vocabulary become freed from particular content and more readily available for varied situations. In our study of imagery we saw how the image follows upon sense-perception, and is itself succeeded by the word, spoken or cut short in thought. We saw also that one function of the image was to make clear the significance of the situation and that, as a clearer apprehension arises, it declines in importance. "When meanings", says Fox, "are fully defined, images tend to disappear from forms

of consciousness. They reappear when an impediment occurs to obstruct the flow of thought." We should expect then that to the stage at which the child 'reasons' with concrete material there will supervene a stage at which images form an intermediate tool. Between the ages of eight and twelve we may see in much of the child's school activity evidence of a half-way house between concrete and abstract reasoning. It is the stage at which the way is prepared for generalizations and at which curriculum and method of instruction are becoming less tied to particular material. At this stage, in the mechanical processes of Arithmetic, numbers are adequate symbols of the operations required, but when a new 'rule' has to be taught the child arrives at the formula by use of concrete material or diagrammatic representation. The familiar problem of the covering of a picture with glass and the binding of it with passe-partout reveals the fact that the old relationships of length are insufficient to meet the new situation. The relationship of the new unit of square measure to the nature of the problem is apprehended. The child begins to cover the given rectangle with the square inches provided, but before he has completed the process old relationships of the multiplication table come into the mind as relevant. The alliance of the multiplication table to the problem in hand produces a new event, namely the rule for area of a rectangle. The extension of this relationship to the properties of the triangle results in yet another new rule for the area of a triangle, and armed with the two formulæ the child can proceed to find the area of any given rectilinear figure.

Generalizations.—The first lessons in experimental science form a good illustration of incentive and method in reasoned activity. The starting-point is natural curiosity in respect of a common phenomenon. The composition of the air, the relation of carbon dioxide to combustion processes, the effect of heat or cold upon the volume of a piece of metal, are all familiar experiments in the middle ranks of the elementary school. At a somewhat earlier age Nature Study lessons form a convenient starting-point for the study of the relation between structure and function in various forms of plant life. From such beginnings springs the conception of general laws, which can be expressed in a simple formula of words. This in turn forms a valuable constituent of knowledge. It helps at the same time to bind together events, to introduce order into the scheme of the external world, and to provide an instrument of approach to more complicated mysteries. The child, like the bridge player, loves to get hold of a rule which simplifies his task.

Similar formulæ emerge gradually from the consideration of the 'lives of people' in different countries, or of events in history. But at this stage the generalizations are only partial and serve as stepping-stones to the investigation of cause and effect which comes later. We have instanced degree of complexity as the essential difference between types of reasoning. To this is generally added degree of abstraction, but the two aspects are not in reality entirely separate.

Abstraction.—Mathematics affords, perhaps, the best illustration of what is conveyed by the term 'abstract reasoning'. This is because it employs special symbols, which have not the direct context of experience con-

veyed by the words of language. But the symbols of Mathematics, in so far as they are used in the elementary school, are themselves generalizations of events experienced with real objects. The advanced mathematician may apparently reverse the process and coin a symbol to stand for the result of a process, arrived at by reasoning irrespective of material phenomena, and then proceed to show that such symbolism does in effect represent aspects of concrete events. But in school we proceed on the old maxim 'From the concrete to the abstract'. When we build up a formula we try as far as possible to use letters which suggest the entities for which they stand. Thus, we use A for area, and P for Principal, but x has to be envisaged as the symbol for a 'missing quantity'. The stage at which the child can appreciate the convenience of such symbols corresponds roughly to the stage at which in other respects his growing intellectual control enables him to drop off particular contexts and to envisage universal truths. This is ascribed to the adolescent years, and it is not until after the age of eleven that the school curriculum is planned with the acknowledged aim of stimulating abstract thought and of encouraging accurate reasoning within this sphere. In a later chapter we shall discuss more in detail the education of the adolescent. It will suffice to say here that progress in reasoning in Mathematics, Science, or in the abstract principles reflected in History and Geography will only be successful in proportion as the corresponding processes with concrete visible material have been practised and understood.

The chief element of abstraction is held to be the

dropping off of unessential characters and the recognition of the permanent residuum. This was touched upon to some extent in connection with the child's use of adjectives. It is easy to find similar examples from the subjects of the school curriculum. The apprehension of a motif in music, of the use of a relative pronoun, of the properties of similar figures, or of the principles of constitutional government, all show on dissection a similar mechanism. In the service of a problem which calls for reasoning such abstraction must be 'relevant', that is it must be made in conscious relationship to the problem as a whole. It is in the capacity to envisage the whole and to make each move in the light of the whole that reasoning ability is pre-eminently shown, and its connection with intelligence most clearly marked.

Professor Burt's Conclusions.—Professor Burt's experiments on reasoning in school children led him as we have seen to the conclusion that the essential constituents of the reasoning process may be found in the child in the top class of the infant's school. His findings in respect of the development in reasoning ability are important and may be summarized here. The difference between the problems solved at an early age and at a later one he found to be mainly one of complexity. The more complex the problem the greater the length of statement required, and the ability to take in as a whole the significance of a connected series of data is one which develops gradually as the child grows in years. In our discussion of memory we saw that for immediate reproduction the child is inferior to the adult, and we find this equally true in respect of retentiveness of logical material. Not

only have all the items of relevant or conflicting data to be borne in mind, but they have to take their place in reference to a single problem. The child of low intelligence breaks down in the last attempt to see the problem as a whole. Professor Burt deduced that reasoning tests were the most effective single instrument for the measurement of intelligence, and that, conversely, the most important element of intelligent behaviour is the power of analysis and reconstruction which is most prominent in the reasoning process.

The Attitude of the Teacher.—If the teacher is influenced by the universal praise of reasoned activity he will strive to provide situations which call for its employment. If he realizes the essential constituents of its processes, and the nature of its developing complexities he will graduate the situations to correspond with the stage of possible achievement. In the infants' school he can give opportunity for relative judgment of weight, length or shape, which will form the basic relationships for later activity. He can encourage those forms of play which lead to skilful adjustment of movement. He will realize that in the field of sense-perception and muscular activity the foundations of reasoning as of all other instruments of knowledge must be laid.

We know, however, that the power to express a relationship in words is evidence of its greater elasticity and usefulness. The 'language lessons' with the young child will therefore have as a prominent aim the development of precision which is itself evidence of relationships understood. When dealing with the use of adjectives by the young child we emphasized

their importance as typical of the abstraction of a relevant quality, and in this we can see a close analogy to the selection of relationships preparatory to their use in constructive reasoning.

In the senior department of the elementary school the task of the teacher is to make the child aware of relationships, to help him to express them in words, and to recognize their applicability. With this in mind he presents the work so far as possible in 'problem' form. He strives to put the child in the position of the discoverer who must find a way to a solution. Given the interest of the child in the problem presented, this is recognized as the most effective instrument of learning. It approaches most nearly to the spontaneous activity of play, and has been given the name of the 'play way' in pedagogical literature. In its interest the child will put forth energy both in action and thought. "Thought", says Miss Edgell, "would most naturally begin in the service of immediate action, wants and needs which could not be satisfied by impulsive behaviour or trial and error methods. . . . It organizes and consolidates the knowledge we already possess, weaving new relations between the strands of disconnected items, and putting us in a position to comprehend further acquisitions of perceptual experience."¹

But as the child grows older the teacher wants to enlist his interest in the achievements of reasoning in the fields of science and to secure his appreciation of cause and effect in practical and moral issues. To some people there is a peculiar satisfaction in reasoning with abstract symbols derivable no doubt

¹ *Mental Life*, page 271.

from the appreciation of the beauty of the process and the unassailable nature of its conclusions. We want as far as possible to extend this appreciation to other spheres in which the conflicting elements are more troublesome and less remote from personal experience. The teacher can help to create a real feeling or 'sentiment' for accuracy in reasoning, and a respect for the great lines of thought which have given us our most valued truths. It is from such sentiments rather than from continued practice in reasoning in any given school subject that the extension of reason into other fields of conduct will proceed.

The Experiments of Köhler.—A discussion of reasoning would be incomplete without a reference to Köhler's experiments with chimpanzees. Most interesting in themselves they are also held to provide the best analogy to the reasoning activities of the child. Köhler contrived a number of situations of graded difficulty in which the chimpanzee could reach food which was within sight, but out of immediate reach only by a more or less complicated mechanism requiring the use of tools. The material for the tools was at hand, but the animal had to shape the tool from the material. The achievements of the animal were remarkable. He would for example fasten two sticks together and so provide for himself a satisfactory tool. We may see in this feat a close correspondence with the child's behaviour in piling the hassock on to the chair in order to reach the jam, but we must remember that while the child could move freely the movements of Sultan were circumscribed by a cage and that his 'reasoning' had to take account of this limitation at every stage.

Now the contention of Köhler and his supporters is that their experiments prove that the animal did not arrive at successful action as the result of trial and error performance, but that he showed 'insight' into the whole problem. The criterion of insight is given by Koffka as the 'appearance of a complete solution with reference to the whole layout of the field'. The emphasis is here on the apprehension of the problem as a whole which we saw to be the essential feature of reasoning. The experiments of Köhler and Koffka have given rise to a renewed emphasis of 'the whole' as opposed to the constituents of a process. Much of the resulting theory is difficult to understand. When, however, Koffka in summing up the conclusion, writes, "The truly essential, lasting and definite product of learning is dependent upon the function of a configuration," he is expressing a truth which should have a real significance for the teacher. It is his special task to help his pupils to see situations as a whole, and to deal with them on this basis.

REFERENCES

- THOMSON. *Instinct, Intelligence and Character*, Chapter XXV.
WOODWORTH. *Psychology*, Chapter XVIII
NUNN. *Education, its Data and First Principles*, Chapters XIII and XIV.
BURT. *Mental and Scholastic Tests*, pages 237-242.
RUSK. *Experimental Education*, Chapter IX.

CHAPTER XI

GENERAL INTELLIGENCE

Introduction.—We have discussed the mechanism of learning in so far as it is held to be applicable to all members of the human species. We have seen that its various aspects are rather an extension of the simple forms of animal learning than an abrupt transition to new methods. Practical skill and theoretical knowledge are acquired through active contact with situations. Our use of words, and ability to use words as symbols for a complex situation, enables us to apply more readily what we have learnt to new conditions, and, through words, the influence of the past becomes crystallized more easily into a manageable formula. But although this is true for all individuals, it is equally clear that all do not learn with the same facility, and that few would appear to learn all things with equal facility. The teacher quickly learns to distinguish groups within his class. Some children are spoken of as clever, others as stupid, some as quick but superficial, others as slow but thorough. Here and there individuals are selected who stand out on the one hand as more than ordinarily intelligent, on the other as being so little able to profit by the ordinary system of education as to demand emphatically some form of special treatment. When

we speak of the genius or the feeble-minded we refer to what is commonly interpreted as degree of general intelligence.

What is intelligence?—By intelligence we understand a factor which is innate and general. In the time of Plato, the term denoted simply the using of the intellect, and the intellect was defined as the power to deal with abstract ideas. That is to say, intelligence was a function rather than a power, but the tendency of later times was to translate intelligence into some mysterious faculty held accountable for all behaviour. Sometimes it has been considered as synonymous with educability, that is, with the ability to acquire knowledge and skill. The modern attitude towards this question may be taken to be that the definition of intelligence is comparatively unimportant since we at least can recognize intelligent behaviour when we meet it. The signs of intelligent behaviour are for the most part agreed upon. Woodworth summarizes them as—

1. retentiveness, that is the power to use past experience,
2. seeing the point of the problem,
3. adaptation of what has been learned to the present situation,
4. responsiveness to relationships,
5. persistence,
6. submissiveness, that is the power of modifying persistence in view of special conditions of the problem,
7. curiosity.

Few people would quarrel with this list of factors. Binet, whose name is inseparably connected with the development of intelligence testing, summarized the marks of intelligent behaviour under the headings of adaptation towards an end, modification of means for

achieving the end, and the power of self-criticism. But whether we choose to consider the marks of intelligent behaviour under three or under seven headings we agree that they tend to be found together and in the view of many leading psychologists to constitute a unit factor.

Professor Spearman has put forward the theory that the degree of success in any operation is dependent upon two factors, one of which is a central factor symbolically expressed as "g" to be considered as equivalent to general intelligence, and the other a specific factor peculiar to the operation involved. It is not necessary here to discuss the various opposing theories which are submitted. The unifocal theory of Professor Spearman is supported by mathematical evidence and we may leave to others the task of challenging it. The important theory for us at the moment is to realize that all attempts to measure "intelligence" do in effect assume that it is a unit factor which is being measured. In regard to the nature of this factor, Professor Spearman considers it as a plastic function of the nervous system, which, while it cannot be cultivated, can be measured, and that in effect is all that the psychologist can do in reference to it. It is with the testing of intelligence that we are now concerned, since clearly, the results of such testing must have a most pertinent reference to the teacher's task.

Under the heading of Tests of Educable Capacity are now grouped together not only tests of intelligence but also tests of attainments and attempted measurement of vocational aptitudes. Under it will doubtless be included, in the future, tests designed to investigate

emotional equipment, but, owing to the difficult nature of the task, these are as yet in their first initiation.

Development of Intelligence Tests.—The history of the development of the attempts to measure intelligence is at once interesting and instructive. They grew essentially from the needs of the educator and the employer for a method of classification and from the study of the mental growth of the child. The question then arose as to what type of test would most successfully measure the factors outlined above.

Professor Burt, the chief English authority on the subject, holds that those tests are best which measure the power of understanding and reasoning. That is to say, he believes that what are alluded to as the "higher mental processes" are the ones in which comparative degree of intelligence is most clearly shown. We have had occasion already to mention some of Professor Burt's specially devised reasoning tests and we shall see in the sequel the part they play in the general scheme of intelligence testing.

The measure of success which has attended the schemes so far devised is due principally to the mathematical basis on which they rest. The method is briefly that, on the basis of the tests, a mental age is calculated which on division by the chronological age of the subject yields what is called the Intelligence Quotient, or Mental Ratio, which in turn is expressed as a percentage. Thus:

$$\begin{array}{l} \text{Intelligence Quotient} \\ \text{or Mental Ratio} \end{array} = \frac{\text{Mental Age}}{\text{Chronological Age}} \times 100.$$

The chief difficulty in the drawing up of Intelligence Tests has been the necessary discrimination between capacity and attainments. The questions set for varying ages must, so far as is possible, demand no more knowledge than could reasonably be expected from children who have had very varying opportunities for school education. Most of the tests now in use are based on those drawn up by Binet and Simon in 1911. Professor Burt has laid down the principle that departures from the Binet school should be either radical or minimal. The various revisions which have from time to time been attempted have aimed at the rectification of the tests in respect of certain defects or of translated application in different countries. It was for example found that the original tests emphasized linguistic ability too much, and also that they were more efficacious in the detection of dullness than in the diagnosis of superior ability.

In connection with the first point of linguistic bias there is undoubtedly a close association between the vocabulary of a child and his mental development. This is particularly true in connection with the vocabulary of number, time, space and colour; and in our brief treatment of the growing use of adjectives by the young child in Chapter VII we showed the nature of the advance which their use denotes. On the other hand it is clear that limited educational facilities will greatly affect the growth of a child's vocabulary. It was found in America, for example, that the application of the Binet tests to children of European parentage who had only recently come to the United States was rendered valueless because of the language difficulty

involved. It has been found necessary also to devise special tests to meet the needs of children of gipsies and bargees.

Amongst the chief variations of the Binet-Simon scale may be mentioned that of Terman, of Stanford University, known as the Stanford Revision tests, and Professor Burt's Mental and Scholastic tests for use with English children. The underlying principle is that the tests should vary in complexity with the age of the children ; Professor Burt's reasoning tests are an important addition and bear out his argument that they form the best instrument of measurement. At this stage it may be well to give illustrations of the type of test in use. The whole may be found set out in Professor Burt's *Mental and Scholastic Tests* published in 1921. The following specimens from the tests for ages IV, IX, and XV are selected as illustrations. They are based for the most part on the tests compiled by Binet and Simon—

Examples of Intelligence Tests.

Age IV.

Child repeats six syllables after the experimenter.

e.g. "I am cold and hungry".

Points to longer of 2 lines.

Repeats 3 numbers.

Age IX.

Names the months of the year.

Names 9 coins.

Defines "in terms superior to use",

i. horse ; ii. chair ; iii. mother ; iv. table ; v. fork.

Age XV.

Gives difference between abstract terms :

idleness—laziness

poverty—misery

evolution—revolution

Draws the appearance, when unfolded, of a paper which has been folded and cut by experimenter.

Supplementary tests for use with individuals are given by Professor Burt under the headings—

1. Absurdities which the subject has to detect; contradictory passages in a short story.
2. Graded Reasoning Tests, in which from given data the subject is required to find the logical conclusion.

Examples have already been given in the preceding chapter.

Professor Burt holds that tests of this nature are by far the most efficient in bringing to light the superiority of bright children.

3. Maze tests of graded difficulty as designed by Dr Porteus.

Calculation of Mental Age.—The methods of application of intelligence tests may be briefly summarized. The experimenter begins with the age at which all tests are passed and continues until no more tests are passed. He contrives to make the environment as free from embarrassment as possible and to guard against the supervention of fatigue in the children who are being tested. The time of the tests varies according to the age of the children, thirty or forty minutes being the usual time for children of six to eight years of age, while for boys and girls between thirteen and fifteen this is extended to fifty or sixty minutes. The correct responses are allowed an age-mark of so many months which varies according to the age for which the test is compiled. Thus, in the

case of tests for ages three to ten, two months is allowed for each correct response, while for the 'average adult' five months is allowed. In order to calculate the mental age of the subject the experimenter first credits him with the full age below the point at which the test began, and, by adding on the number of months corresponding to all the tests answered he arrives at the mental age. Then, as we indicated above, he divides by the chronological age of the subject and expresses the result on a percentage basis. This gives the Intelligence Quotient, or Mental Ratio, of the subject concerned. For a more detailed account of the process of administering the tests the reader is referred to the books mentioned at the end of the chapter.

Age Limits of Development.—We may here call attention to the fact that the tests as at present arranged do not carry an age-assignment after the age of sixteen has been passed. Terman indeed includes tests which he calls respectively average adult and superior adult, but they follow directly upon the tests for fifteen years of age. It is clear that there may be one of two possible explanations of this apparently early cessation. Either the development of a central intelligence apart from knowledge ceases at the age of sixteen or it has not yet been found possible to devise tests, not involving specialized knowledge, which would be adequate to test the higher development. Much attention has been paid to this point by leading psychologists, and the conclusion would appear to be that improvement after the age of fifteen or sixteen would seem to be due to improved methods of approach rather than to improvement in the central factor of

general intelligence. Professor Spearman sums up the conclusions by saying, "The evidence indicates that the growth of 'g' certainly does not continue to any appreciable amount after the ages of fifteen or sixteen and perhaps even ceases some years earlier."¹

A cognate question of greater importance from the teacher's point of view is as to whether the intelligence quotient of a given child remains constant up to the time of fifteen or sixteen years of age. On this point Professor Spearman's conclusion is that while the actual value of 'g' increases from birth—at first rapidly and then more slowly, to about the age of fifteen years—the relative value of 'g' as measured by the Intelligence Quotient remains fairly constant. The conditions of experimental testing make the verification of this constancy difficult, but a carefully devised series of experiments conducted at two-monthly intervals between the ages of eleven and twelve gave reliable evidence of a constant I.Q. at this time. We may once again quote Professor Spearman's conclusion.

"If once then a child of eleven years or so has had his relative amount of g measured in a really accurate manner, the hopes of teachers and parents that he will ever rise to a much higher standard as a late-bloomer would seem to be illusory."²

Group Tests.—The intelligence tests which we have so far discussed were intended for use with individual children. Their application as such to large numbers was rendered difficult on account of the large expense of time involved. The need for such application was

¹ *The Abilities of Man*, page 364.

² *Ibid.*, page 367.

felt on a wide scale during the war, when in the American Army tests were used to single out at once the most valuable and the least from amongst the recruits. The tests were to serve as a basis for deciding the rank and nature of service of men who had had no previous experience of soldiering. In order to meet this demand 'Group Tests' were evolved which, since they required only written answers, could be given to large numbers at the same time. They included such of the individual tests as lent themselves readily to adaptation for group-testing, reinforced by new problems. The group test consists essentially of a large number of short tests. After the war they were taken up by some education authorities for purposes which we shall discuss hereafter. We need only mention here the Northumberland Standardized Tests. The examples given below are taken from the 1925 series standardised by Professor Burt. The tests are enclosed in a booklet, one copy of which is given to each candidate, who is required to answer as many as possible of the questions in each test in the time assigned. The nine tests in the book are classified as—

1. Understanding Instructions of which an example is :

If MARMALADE contains more 'M's' than MINIMUM write M; if not say how many capital M's there are in this question.

2. Opposition.

Example.

Noon Midday. Same. Opposite. Unknown.

The candidate is required to underline, same,

or opposite or unknown according to his judgment on each item.

3. Similarities.

STOOL. CHAIR. TABLE. Room, floor, sofa, bedstead.

The candidate must discover the nature of the bond between the words printed in capitals and underline the two things on the right hand side which are connected in the same way.

4. Mixed Sentences.

The task of the children is to rearrange the words to form a sensible statement and mark the result as true, false or not known.

e.g. Money people much not have poor.

5. Completing sentences by correct choice from a given list of words.

e.g. A (kind, tall, short) man is (often, always, never) cruel to animals.

6. Selecting reasons.

e.g. Why are thermometers useful ? Because they

- (1) regulate the temperature
- (2) tell us how warm it is
- (3) cure diseases.

7. Simple Reasoning. The correct result has to be underlined.

e.g. I had a seat facing the engine and saw the sun setting through the carriage window on my left. In which direction was the train travelling.

North—South—East—West.

8. Following an argument.

e.g. It is (fortunate, unfortunate, wrong) that people are so (different, similar, amiable) for the (man, world, teacher) has all kinds of work that (needs, hates, fails) to be done.

9. Detecting absurdities in a long story. One sentence for example runs—

That afternoon just after he had had his breakfast he called for his two friends, Brown, Jones and Green.

Such tests are now used on a considerable scale by many educational authorities and institutions. They are considered a useful supplement to the results of written examinations or to the personal estimate of a candidate's fitness for promotion. One notable instance in which they were tried with success was under the Northumberland County Council in connection with children from rural schools in remote parts whose education had apparently not fitted them to continue to a secondary school course. The children who were subsequently accepted on the basis of group intelligence tests proved a complete justification for the experiment.

Performance Tests.—We spoke before of the linguistic bias attached to the Binet-Simon Tests and of the disadvantages of their use with children of special circumstances. It is also clear that disadvantages would accrue in dealing with children of markedly low intellectual ability. To meet these disabilities a special type of test has been designed, known as Performance Tests. Since they were designed to meet

the needs of special cases, little need here be said concerning them. They consist essentially of a series of practical operations which have to be performed either after verbal instruction from the experimenter or after seeing the operation performed by the experimenter. Examples of such tests are the fitting of insets into appropriate holes, and the piecing together of a picture puzzle. The first test was used in the middle of last century by Séguin in his work with mental defectives. It recalls an important item in the training of self-perception in the Montessori Schools of to-day. Incidentally, we may note how the study of the gradual evolution of mental tests is a constant reminder of the service which the investigation of defectives has rendered to educational experiment in the treatment of the normal child.

Diagnostic Value of Intelligence Tests.—The teacher in school may not be called upon to administer tests of intelligence. It is indeed necessary that he should understand the importance of expert technical knowledge on the part of the investigator. What primarily concerns the teacher is the use to which the test can be applied and the significance of some of the results obtained. The uses may briefly be summarized as diagnostic. On the basis of the intelligence quotient may best be decided the grading and methods of treatment of the children concerned. The practice of promoting by age alone is obviously not calculated to secure for the child the most satisfactory conditions for his further development. Neither is promotion on attainment alone sufficient. From the point of view of school classification and individual method of treatment it is clear that the results of Tests of Intelli-

gence and Tests of Attainments must be considered together, and this is particularly true of the children who fall into the so-called "normal" group. It will be remembered that one of the criticisms levelled against the original scale of Binet-Simon tests was that it was better calculated to discover the sub-normal than to detect the child of superior intelligence. It may perhaps be suggested that all intelligence tests are most valuable in detecting abnormalities. But within the middle ranges, if we assume that the intelligence quotient remains constant, it should be clear that its determination may be a helpful factor in determining subsequent treatment. The most important corollary in this respect is likely to be the adjustment in speed of learning, so that the child of low intelligence may escape from the discouragement incidental to a continual falling behind the rest of the class in speed of assimilating what is presented, while the child of high intelligence quotient may forge ahead at his own rate. We are being constantly reminded by educational pioneers that class-teaching must of necessity fail to take into sufficient account the difference in individual rates of learning. Since it would appear unlikely, and indeed undesirable, that a measure of class-teaching will ever disappear entirely from our educational system, we may well avail ourselves of the instrument afforded by mental tests to adjust in some degree the worst defects. On the other hand there are those who speak of the value of competition and stimulation afforded by a class of mixed abilities, and who point to the stigma attached to a progress through the B forms of a school. The problem is to remove this stigma, and this may

probably best be done by adjustments in syllabus and curriculum which will ensure to the child the requisite need of satisfaction. A child who is working constantly with children of far superior intelligence and probably younger in age will presumably be equally if not more liable to the disastrous emotional effects of emphasized inferiority and disability.

Significance of some Intelligence Quotients.—The following tables of the significance of certain intelligence quotients, compiled by Professor Burt, show the relationship between intelligence—type of school and probable vocational level in later life. They are of special interest to the teacher of to-day in view of the proposals to provide a change of school for all children after the age of eleven has been reached. The suggested types of schools are discussed in Chapter XVIII, and the proposals embodied in the Board of Education Report on the Education of the Adolescent may well be considered in conjunction with the table given below.

A. *Children*

| I.Q. | Incidence. | Remarks. |
|----------|------------|---|
| 200 | very rare | denotes genius. |
| 150 | .02 % | Secondary School and University |
| 130-150 | 2-3 % | Win junior scholarships—go to secondary school but not to university. |
| 115-130 | 10 % | Just miss Scholarships—go to Central Schools. |
| 100-115 | 38 % | Good average for elementary schools. |
| 85-100 | 38 % | Poor average. |
| 70-85 | 10 % | " Dull and backward ". |
| 50-70 | 1.5 % | Feeble-minded. |
| below 50 | .5 % | Idiot and imbecile. |

| B. <i>Adult.</i> | | Occupations. |
|------------------|-----|---|
| 150+ | .1% | Higher professions. |
| 130-150 | 3% | Executive or junior professions |
| 115-130 | 12% | Clerical. Highly skilled technical. |
| 100-115 | 27% | Ordinary skilled technical and minor commercial. |
| 85-100 | 36% | Semi-skilled and mechanical |
| 70-85 | 18% | Unskilled labour |
| 50-70 | 4% | Casual labour |
| below 50 | .2% | Imbecile. |

REFERENCES

- BURT, *Mental and Scholastic Tests.*
 BALLARD. *Mental Tests*
Board of Education Report. Tests of Educable Capacity.
 WOODWORTH. *Psychology*, Chapter XII.
 THOMSON. *Instinct, Intelligence and Character* Chapters XVII –
 XXI

CHAPTER XII

TESTS OF ATTAINMENTS AND INDIVIDUAL DIFFERENCES IN SPECIFIC ABILITIES

Standard of Attainments.—The teacher must often feel that his primary concern is to secure that the children in his charge reach a certain standard in the subjects of the curriculum. Although the day has passed when the payment of a government grant was dependent upon the satisfactory performance of each child in a given set of tests imposed by external authority, it remains true that the ability of the teacher is largely judged by the attainments of his pupils. It is also true that the imparting of knowledge is not the least important function of the school. At the present time, when a necessary and perhaps tardy emphasis is laid upon the development of individuality and upon the primary importance of spontaneous expression, there is perhaps a danger that the just claims of intellectual knowledge may appear to be overlooked. Professor Godfrey Thomson has recently reminded us of this in his *Philosophy of Education*. It is, he says, the school's "peculiar privilege" to supply intellectual knowledge—"if the school does not do this, nothing else will". But within the walls of the class-room there is little evidence

that the class-teacher is unmindful of his task in this respect. He is, however, probably less immediately concerned with the comparison of the attainments of his class with a desired standard, than with the real and pressing difficulty of reconciling within the scope of limited time and opportunity, the conflicting claims of individual members. He is painfully aware of the wide divergence in achievement which obtains amongst the members of his class. When, for example, one enters a class-room in which an Arithmetic lesson is in progress, it is rarely that one sees the class working as a whole. One finds instead probably three different groups working at three distinct stages, and the limitation of the groups to three is probably rather a concession to the limitation of the teacher's physical activity than an exact interpretation of the requirements of the class. The teacher must constantly concern himself not only with wide variations within the group, but with individual cases of marked backwardness in some specific subject. The ideal at which he aims is that each child shall progress as far and as rapidly as his ability permits. In other words, the Mental Ratio of the individual should be a reliable index of the degree of intellectual performance which may be expected of him. But, while the good all-round child is to be found in all classes rejoicing the heart of the teacher, there are also others whose performance in some subject would appear to be lamentably disproportionate to their apparent general intellectual ability. The teacher feels the need for some standard of measurement by which he may compare accurately the achievement of the child with his potentialities, on the basis of which comparison

he may proceed to diagnosis of causes of disability and to consequent remedial treatment.

Such a standard is provided by what are known as Tests of Attainments. We have seen that the object of intelligence testing was to measure the capacity of the mind without measuring its contents. To secure a reliable measure of knowledge, norms of performance must be devised. The standard tests of the code of the Board of Education in the days of payment by results were attempts to establish such norms. They suffered, however, from the double disadvantage of being imposed externally and of representing a goal rather than a test. Binet issued his 'barème d'instruction', which was based on the average performance of a large number of Parisian children, but which was admittedly a very rough-and-ready instrument. Much work has since been done both in America and in this country upon standardized tests of attainments. It is recognized that such tests, in order to be valid as standards, must be first tried out on very large numbers of unselected children. They represent, when completed, the standard of achievement which fifty per cent. of the children so tested do in effect attain. The score of a child in the attainments test for a particular subject, gives, when divided by his mental age, his achievement quotient. It is thus clear that the achievement age of a child in the subjects of the school curriculum may vary. By plotting a graph of the achievement age of a child in the main subjects of the school course it is possible to see at a glance his relative proficiency in these subjects. Such a graph is known as the educational profile of the child. As an indication to

the teacher of the degree and location of weakness it forms a useful starting-point for further investigation into specific causes of backwardness.

Technique.—Particular attention has been paid to the scales of attainment in reading and arithmetic, the two major subjects of the curriculum of the elementary school. Before discussing these in some measure of detail we may perhaps refer to a technique of questioning on which attainments tests in any subject may be based. It was realized that in order to arrive at anything approaching a standardized test the procedure of the ordinary examination paper must be radically changed. To avoid ambiguity or personal bias in marking it was necessary to devise a form of test in which the answers were, so far as possible, single words but which must yet contrive to test detailed accuracy and sound judgment. Three types of technique have stood out as particularly useful in this respect. They are known as the Completion Test, the True-false test, and the Multiple Choice test.

In the Completion Test the examinee is required to fill in the missing words in a statement. For example, the child in school might be asked to complete the statement: 'The Mediterranean type of climate is distinguished by —. It is to be found in —. The resulting types of vegetation are —'. The student of educational psychology might be required to fill in the blanks in the sentence: 'Memory for immediate reproduction is greater in — than in —. For permanent retention learning by — better than learning by —'.

In the True-false test all that is necessary is to mark a given statement as true or false or to distinguish

it by a + or — sign, as for example: Plants which grow in hedges have short stems. Imagery is aroused by some form of sense-perception. In the Multiple choice question the subject has to underline the one of a given number of answers which he judges to be correct. For example: The product of two mixed

numbers is $\left\{ \begin{array}{l} \text{always} \\ \text{sometimes} \text{ greater} \\ \text{never} \end{array} \right.$

than each of the factors.

The power of a word to drop its particular associations comes $\left\{ \begin{array}{l} \text{gradually} \\ \text{suddenly} \end{array} \right.$ in childhood from hearing the word used in $\left\{ \begin{array}{l} \text{varying circumstances} \\ \text{a single instance} \end{array} \right.$

The technique here described may often be usefully employed by the teacher who wishes to test briefly the assimilation by the children of a previous course of lessons. It is doubtful whether it will ever supersede entirely the more general form of examination. Dr Ballard in his book *The New Examiner* puts forward a plea for the more extensive use of such devices. He claims that reform in examination testing must be from the subjective to the objective—from guesswork to measurement, and that the new examination must test “the residuum of knowledge when all allowance has been made for difference in working schemes”. To the criticism that such a technique does not test the capacity of the mind to test large and complex wholes he has replied that “the organic whole is of little use to the examiner if he cannot measure it”

and that the quality of the unit tested by the New Examiner is fundamentally the same as in the old examination. While, however, the class teacher may not feel able so to refine the technique described as to yield a very delicate instrument of measurement, he will probably be quick to appreciate its value as an interesting variant upon the formal test or even upon the "ten short questions" by which he has been accustomed to test knowledge acquired.

Tests of Reading and Arithmetic.—We must now return to the standardized tests of attainments in the two major subjects of Reading and Arithmetic. In this country the scholastic tests of Professor Cyril Burt are the best known. The reading tests contain—

- (a) graded vocabulary test—for mechanical accuracy of pronunciation.
- (b) letters and figures—for use particularly with children of low intelligence quotient.
- (c) Two and three letter monosyllables—for testing speed (with normals) and accuracy (with defectives.)
- (d) graded directions test—for comprehension. (In this test the child, having read the printed instructions, is required to put them into practice.)
- (e) continuous prose test—for speed, accuracy and comprehension.

The last-named test is for use with older children, and is perhaps to be regarded as the most important. Comprehension is tested either by questioning or by reproduction by the child of the gist of the passage read. In discussing the value of reproduction Professor Burt calls attention to the extreme variety in

such reproductions, and to the interesting sidelight which they cast upon the child's individual emotional make-up, and leaning towards scientific accuracy or towards imaginative embellishment. The system of oral or written reproduction of narrative which forms the basis of the P.N.E.U. method initiated by Miss Charlotte Mason should prove a constant source of information on these diverging tendencies. One wonders how far the imaginative embellishments of the one type of individual become gradually pruned in the interests of scientific accuracy.

Arithmetic.—Attainment in Arithmetic is measured by a series of graded questions devised to test—

- (a) accuracy in mental arithmetic.
- (b) accuracy in written tests consisting of ten questions for each age—five of which are straightforward, while five are of the type of simple problems.
- (c) speed in fundamental rules, designed primarily to test children whose training in arithmetic has been affected by adverse external causes.

Professor Burt also includes graded tests of spelling, writing, drawing, handwork, and composition. In these the student is referred to the detailed account given in his *Mental and Scholastic Tests*. In particular the illuminating analysis of types and causes of backwardness in the subjects tested is of invaluable practical aid to the teacher. The problem of backwardness is one of the most urgent presented by the class-room. The conscientious teacher is worried by the failures and is anxious to extend whatever individual care his limited time permits. He is, however, only too

much aware of how futile such individual help may be unless he can diagnose successfully the root causes of the trouble. It may then be helpful to sum up briefly the findings of the experts of the general lines along which backwardness must first be diagnosed before the teacher can proceed either to a more detailed investigation himself or to the reference of an individual case to expert authority.

Backwardness,—"To diagnose", says Professor Burt, "the mere fact of backwardness in some particular subject, even to measure its amount, is still not sufficient. The teacher should also analyze within that subject those special aspects or elements of it in which the child is peculiarly weak."¹

In the survey of the significance of certain intelligence quotients we saw that a quotient of 70 to 85 per cent. represents the technical distinction of the 'dull and backward'. In the case of attainments tests the corresponding technical division is realized by a retardation of one year. Such a degree of backwardness calls essentially for special treatment, the provision of special classes and the modification of general method. Backwardness in a lower degree than the retardation of one year can with knowledge of the contributory causes be attacked within the existing group. These causes are divided by Professor Burt into two main groups which he distinguishes as—

- (a) non-mental, which may result from irregular attendance, bad teaching, physical defect or emotional disturbance,
- (b) intrinsic mental factors such as weak, general or specific ability.

¹ *Mental and Scholastic Tests* page 207

Of the first group physical defect—particularly of sight or hearing—will at the present day be diagnosed by the school doctor. Most teachers are familiar with the sudden improvement in school work following on the treatment of adenoids. The observant class teacher can generally detect signs of such physical disabilities and be instrumental in bringing them to the notice of the doctor. Serious emotional disturbance is more difficult to diagnose but will probably be inferred from acute disciplinary difficulties. The remaining intrinsic factors—irregular attendance and bad teaching—are only too familiar to the teacher. The child's plea, so often repeated, "I was not here when you gave that lesson", leaves the teacher helpless and filled with futile irritation. He is driven to find a few odd moments in which he may try to repair by individual attention the loss suffered through absence. But it is rarely that a child whose attendance is strikingly irregular can recover the ground lost. The obvious remedy is to remove the cause of absence in so far as this is possible. The teacher is perhaps apt to diagnose as 'bad', teaching along lines other than those which he himself follows. The child who moves from school to school undoubtedly suffers from resultant lack of continuity in method. This is perhaps particularly true in the case of arithmetic. Within the several departments of one school we are familiar with the difficulties of the child who was taught subtraction by decomposition in the infants' school, and who is required to turn to equal additions or to complementary addition in the upper school, and of the girl or boy accustomed to the unitary method of working proportion sums who is expected in the

interests of progress to change suddenly to the expression of equal ratios. To the plea that 'last year we did it in this way', the teacher is perhaps apt to retort that 'Now you must do it in my way', and to expect that the child will from pure obedience discard old habits. He fails to take into account the conservative clinging of children to the old and familiar, and in his probably justifiable belief that the new way provides a more delicate and elastic instrument, he is apt to make insufficient allowance for the temporary confusion which may result. It should be possible, within the school, to secure, by adequate co-operation, that reasonable degree of continuity in method is attained. On the other hand, it must be remembered that individual children respond differently to the same method. It is therefore not advisable that a teacher should be so deeply wedded to his own methods that he is unable in the interests of the child to try another when his own have apparently failed.

We are reminded of this fact by Professor Burt in his analysis of specific causes of backwardness. "The teacher", he says, "may well adopt the plan pursued often half unconsciously by his most successful colleagues, that is, experimental teaching. Essentially it consists of individual instruction carried out by constantly varied devices and by widely diversified methods, but it is to be accompanied always by close observation of the child's spontaneous method of attack and by a detailed study of the ways which the child can, does and will by preference follow and adopt in learning a given piece of work, and it is to be succeeded always by an intensive training in the

most defective operations by means of the least defective mental channels.”¹

Backwardness in Reading.—The graded reading tests will yield valuable information to the teacher, of the processes in which the child breaks down. The knowledge of the methods by which the child learnt to read will throw further light on the nature of the difficulty. Professor Burt recommends the further testing in respect of the separate operations involved—for imagery, memory and power of rational analysis. But he inclines to the belief that the most helpful procedure consists in trying to teach the child to read by varied methods without prejudice in one direction so that, from the experiment, may be selected the method which yields the best results. An investigation into backwardness in reading was recently conducted by Miss Gertrude Hume. Her conclusions are grouped under five headings and may be quoted in full. The report is taken from the synopsis of a paper on Backwardness in Reading read by Miss Hume to the Education Section of the British Psychological Society.

- (1) Backwardness in reading does not appear to be attributable to any specific mental condition of ‘word blindness’, but rather to failure to form efficient reading habits.
- (2) Failure to form good reading habits may be due to some external cause or to innate temperamental defect, or most commonly to a combination of these factors.

¹ *Mental and Scholastic Tests*, page 268.

- (3) Inquiry into a child's school testing reveals the fact that symptoms of the later disability in reading appear in the earliest stages of learning, but these are frequently regarded as signs of poor general intelligence or laziness.
- (4) Since the worst cases in this investigation could match words, could detect differences between words partially alike, and could recognize some few words at sight, it may be assumed that they were all capable of learning to read.
- (5) But the method of teaching must be based upon the individual difficulties; it must be flexible, so that it may utilize any mode of approach that seems suitable. Above all, it must enlist the whole-hearted co-operation of the child, at each stage of the process.

Backwardness in Arithmetic.—"Arithmetic as practised by the elementary school", says Professor Burt, "may be regarded as little more than a huge bundle of specific habits and memories. Hence with the poor arithmetician the problem for the teacher is often simply this: to find which particular habit or memory is not operating as smoothly as it should."¹ The graded arithmetic tests referred to above provide a valuable instrument by which the teacher can ascertain the nature of the operation in which the child most frequently breaks down. Psychological tests of memory and of reasoning power are also relevant, but except in extreme cases of backwardness they will probably not be required. A cognate

investigation to that undertaken by Miss Hume in respect of reading was conducted by Miss Wheeler on the causes of backwardness in arithmetic. A few of the points which she brings forward in her report are of special interest to the general class-teacher. Under the heading of home environment, for example, she shows how the limited background of a poor home with inadequate material for play may adversely affect the child's concept of number, and his manipulation of arithmetical material. Teaching methods receive, as one would expect, a large share of attention. We may refer particularly to the disastrous effects of insufficient oral practice and to the prolonged use of such devices as putting down the carrying figure before proceeding to the addition of the next column. Miss Wheeler attributes to emotional disturbance the common failure of children to sustain attention, which results in a breakdown in the middle of an operation, when the beginning has been promising. Without pursuing further the intricate nature of the factors contributing to backwardness in arithmetic, we may call attention to one point which stands out in all investigations in this subject. Backwardness is diagnosed by a graded series of examples, treatment is designed on equally careful graded material. The teacher of arithmetic is constantly reminded that the secret of success lies to a large degree in the careful grading of examples. He has now at his disposal a large choice of text-books skilfully compiled. There is, however, one point which may be emphasized. Unless the teacher is himself aware of the principles upon which the examples are graded, he will not be able to use them with complete success. He is perhaps

a little apt to take for granted that the examples in the text-book must be suitable and that, provided he is himself armed with a book of answers, preliminary study of the examples is unnecessary. Such a confidence is generally misplaced, and may lead to the occurrence of avoidable difficulties. The diagnosis and treatment of backwardness is admittedly important, but the prevention of backwardness where possible is even more so. It is the belief of the writer that a considerable proportion of backwardness in arithmetic could be prevented by a more precise awareness of the nature of the danger points in the progress of the subject, and by a meticulous attention to the principles of adequate grading.

Conclusion.—At the beginning of the last chapter we cited Professor Spearman's doctrine that success in any operation is the joint product of general intellectual ability and specific abilities peculiar to the operations involved. We may expect to find the same principles at work in respect of the child's progress in the various subjects of the school curriculum. Professor Burt in his analysis of the distribution of educational abilities has outlined four main groups of subjects in respect of which specific abilities may be recognized. These he distinguishes as (a) arithmetical, (b) manual, (c) linguistic, (d) literary. The class-teacher can easily verify for himself the validity of these divisions. He is aware of the connection which exists between a high degree of general ability and corresponding success in different subjects. The 'good all round child' is above the average in most of the subjects of the curriculum, although he may have a weak spot in drawing or even in spelling.

The dull child may relieve the mediocrity of his general performance by some startling success in one subject. And between the two the majority fluctuate in ability to some degree in the various branches of learning. The school aims at securing to each child the best development of his powers and the satisfaction which is his due. All teachers lament the system by which a child may be kept for two years in a class of children younger than himself, because his attainments in reading and arithmetic do not warrant his being promoted. It is admittedly a difficult problem, but it is a question whether more use might not be made in the elementary school of the system of cross classification in respect of certain subjects which is a common feature of secondary schools. The advantages of this system would seem far to outweigh its most obvious defects. The time-table of the elementary school is in general so constructed that the whole school is given up to arithmetic teaching for the same period of the day. In some schools the lower half of the school has an arithmetic lesson at one time, the upper half at another. Where either of these conditions obtains it would appear to be clearly advantageous for both teacher and child, if the individual were taught arithmetic, not necessarily with the class of which he is a member, but in the division to which his attainments in the subject are most suited. In some schools this system of cross classification is applied to the two subjects of English and Arithmetic with great success. The contrary argument that children in the elementary school are too young to profit by change of personality in the teacher for the different subjects of the curriculum

would only in practice appear to apply to comparatively few children. It is clearly necessary that the child shall feel that there is some one person who is responsible for his welfare and interested in his movements, but the class-teacher has the child in his charge for a large portion of the school-day. For the rest of the day he is working at his appropriate speed and is spared the reproach of being a hindrance to the progress of the rest of his class; while the necessary incentive can be provided by the possibility of advancement to a higher division as his attainments approach more nearly the standard required.

REFERENCES

- BURT. *Mental and Scholastic Tests.*
BALLARD. *Mental Tests.*
Board of Education Report. Tests of Educable Capacity.
WOODWORTH. *Psychology*, Chapter XXIII.
THOMSON. *Instinct, Intelligence and Character*, Chapters XVII-XXI.

PART II

CHARACTER AND DISCIPLINE

CHAPTER XIII

ASPECTS OF DISCIPLINE

An understanding of the way in which children learn and a consequent adaptation of methods of teaching should give the teacher a more living interest in his work and a greater efficiency in its execution. The appreciation of individual differences, in general and specific abilities, should help to remove some of the anomalies of large classes and relieve the distress of both teacher and children in respect of individual failures. There remains for our consideration that other important but more intangible problem of the teacher, the reactions of the members of the school one to another and the interaction of teacher and child. Such problems may be included under the title of "discipline" if we understand this term in its widest sense. The teacher groups in his mind the conceptions of discipline and of character, but reserves a special compartment for that variant of discipline which constitutes order in the class-room.

From the "Approach to Teaching" we may select the two following passages as typical of the double interpretation which the term discipline admits:

"The young teacher must expect to find that his fitness for the work is measured at first mainly by his power to keep order". "True discipline is something more than decorum, although seemly conduct is one of its outward and visible signs. The inward grace which alone deserves the name of discipline, and should be the teacher's aim, is the power of self-control."¹

"School order", says Sir Percy Nunn, "consists in the maintenance of the conditions necessary if school life is to fulfil its purpose. Discipline, on the other hand, is not an external thing like order, but something that touches the inmost springs of conduct. It consists in the submission of one's impulses and powers to a regulation which imposes form upon their chaos, and brings efficiency and economy where there would otherwise be ineffectiveness and waste. Though parts of our nature may resist this control, its acceptance must, on the whole, be willing acceptance—the spontaneous movement of a nature in which there is an inborn impulse towards greater perfection or 'expressiveness'".²

A concept which touches the inmost springs of conduct and which deals with the slow progress from random expenditure of activity to economical control in the interests of some more complete expressiveness, is of necessity a difficult one to assimilate. The young teacher, preoccupied with the problems of class-room order, soon discovers that it is impossible to preserve permanently this outward decorum without some understanding of the inward grace which should

¹ *The Approach to Teaching*, page 48.

² *Education, its Data and First Principles*, page 198.

accompany it. An attempt to divorce the two leads inevitably to methods of repression and punishment, to the establishment of fear as the chief instrument by which order is maintained. All teachers who give thought to their task agree that fear is at best a sterile source of order, and that it is unlikely to produce the type of individual most valuable to the community at large.

Method and Discipline.—The authors of the *Approach to Teaching*, in sympathy with the difficulties of the young teacher, give practical advice and indicate at the same time the nature of the problems which lie behind their maxims. From their precepts we may select one which has an obvious reference to the study of the learning processes which we have already undertaken. "The best safeguard . . . is for the teacher to have his lessons well prepared . . . method and discipline are closely connected."¹ Are we then to understand that the more successful the instruction the more effective will be the discipline of the children taught? It is encouraging for the teacher to realize that the problem is at least a continuous one. It may be replied that the most carefully-thought-out lessons will not suffice to secure the 'good behaviour' of a difficult child, and that even though such informed technique may produce in the majority the signs of orderly activity and outward decorum, we have no guarantee that discipline in the wider sense is being promoted with equal efficiency. But if we look round the class-room and see the children at work with apparent interest we feel that things are going well. The reformation, temporary or permanent, of a naughty

¹ *The Approach to Teaching*, page 48.

child has often been secured by enlisting his interest in some co-operative model, on which, through the influence perhaps of home circumstances and of his father's occupation, he becomes an authority and a valuable source of supply of material. We know that the behaviour of children varies from lesson to lesson, and the teacher is quick to see the connection between this fact and his own relative skill in teaching the various subjects. Given the activity of the child and his urgent need to understand his environment, it is clear that the teacher has here the most effective instruments for preventing the possibility of those other forms of activity which are not in harmony with the demands of 'school order'. "The school should provide such opportunity that there should be no need for the child whose self-assertion is strong to satisfy it by rebellion." This is ideal advice and connects easily with the careful planning of curriculum and of methods of instructional procedure.

Minor Disturbances.—Two types of problem are the particular concern of the teacher. One is the periodic variations of behaviour which occur amongst the most "well-behaved" classes. The other more serious one is the presence of admittedly difficult children, with whom the most careful treatment appears to fail and who are responsible for the more serious, as opposed to the trivial, disturbances of the classroom. The discussion of the latter type must be postponed until we are better able to understand the probable causes of such marked intransigency. In regard to the first point a few obvious considerations may be brought forward. The experienced teacher knows well the 'danger spots' of the day and week.

The end of a morning or afternoon, the transition from a 'games' to an academic lesson and, notoriously, Monday morning and Friday afternoon. The factors of fatigue and of inertia which makes it difficult to change easily from one type of work to another, are taken into account in the drawing up of the timetable, and it remains for the teacher to recognize the cause of resulting misdemeanours and to show understanding of them in his treatment.

The young teacher is urged to organize the distribution and collection of materials so that they move with a smooth precision, itself a bar to disorderly occurrences. Children have a regard for precision and order, and respect a machinery which works day by day with the same efficiency. Sir Percy Nunn speaks of the "routine tendency" which "should be allowed to act in school, as in the wider social community, like the fly-wheel whose momentum keeps a machine in orderly motion, overcomes obstacles and carries it past the 'dead-points' where the prime motive forces cease for an instant to act".¹ The tendency of modern educational practice is to depart from the old system of 'working by numbers' in which the child in a mental arithmetic lesson, for example, takes up his pen at the number one, writes the answer on two, and replaces the pen on the desk at three, crowning these manoeuvres in many schools by 'hands on head'. The reason why this practice is rightly deprecated may be summarized briefly as an unwillingness to impede the spontaneity of individual constructive work by externally imposed machinery. In preliminary matters of common import

¹ *Education, its Data and First Principles*, page 61.

it is clearly to the advantage of all members of the class that there should be some organized machinery. They should be regarded as preliminary to the main interest and for this reason to be as quickly despatched as possible. There will, of course, always remain the child who prefers to leave his seat and enjoy the limited amount of movement afforded by fetching paper or cotton, and while the teacher may feel called upon to restrict this freedom he cannot feel that it is intrinsic naughtiness and his rebuke can be of the humorous variety. It is in general a mistake for the teacher to assume a severity which he does not feel ; since the rebuke is in such cases unconvincing. He must contrive to imply that circumstances require the restriction of an otherwise natural activity. When the material to be distributed is novel, the most carefully planned attention to detail is not always sufficient to avoid a breach of decorum. Most students dread the Nature Study lessons, and regard the distribution of snails as an inevitable source of excitement. That a well-trained class should 'go to pieces' on such an occasion is a commentary upon the poverty of the background which the previous experience of the children has provided for them. It is a sad thing to see the teacher remove the specimens before he or she can begin the lesson. We discussed in a previous chapter the requirements of organized observation, and the sooner the children can come down to this the better, but a margin of time must be first allowed for initial excitement at the novelty provided.

Personal Relations of Teacher and Class.—Every teacher is aware that he works out for himself in

time his own individual class-room discipline. He recognizes that this is not so much a question of carefully-thought-out technique, although in the beginning this plays an important part, as of the nature of the relationship which grows up between himself and the class as they come to know each other better. He knows that once this relationship is established upon a satisfactory basis nothing will shake it and that he may safely indulge in radical departures from his previous strict régime. The personality of the teacher is cited as all important, but this same personality is the product of experience working upon an hereditary basis. It cannot be violently changed and the young teacher has had little previous experience of the interaction of his own with the individual personalities which constitute the class. He is apt to be either too conscious of himself or too much overawed by the class. And so a feeling of opposition is created which is definitely prejudicial to good relationships. The teacher has to learn to extend to the members of his class the respect which he would show to his contemporaries, and to convey to each individual child an interest which is genuine and informed. He has to recognize that he has in regard to the children an initial prestige of age and acquired experience, and he learns quickly how readily the class will reflect his own attitudes and moods. We are familiar on the one hand with the reaction of a class to excitability and restlessness on the part of a teacher, and on the other with that lethargic inactivity posing as good behaviour which reflects the soothing type of teacher. It is a difficult thing to contrive to be at once stimulating and stable,

and yet this is what the teacher must achieve. In connection with this phase of the teacher's influence it is natural to use the terms 'imitation and suggestion' under which so much of the child's development both in the sphere of intellectual and of moral progress is included. While the discussion of these two modes of activity can be more satisfactorily undertaken when we turn to the psychological characters of the group, we may at this juncture call attention to one or two points in their regard. We can distinguish between the deliberate imitation which we employ in respect of dress or style of writing, and the apparently unconscious imitation of mannerisms and forms of speech by which children acquire, on the one hand, patterns of response of which they cannot as yet understand the full import, and on the other, habits of speech or behaviour which are difficult to eradicate. Suggestion has been called a " 'half-way house' to the control of reason". Through its agency the individual takes over codes of behaviour which he may later through reason reject, but which serve as interim standards of guidance in a world of conflicting values. The teacher has clearly great powers of suggestion. It is not uncommon to find the child quoting at home the chance remarks of the teacher in argument against parental decrees. At a stage of the child's development the school assumes a higher authority than the home, and in the years of early adolescence boys and girls turn eagerly to the ideals set before them by admired teachers. The teacher must then use wisely this power of suggestion. He must not make it an instrument of power, to augment his self-esteem, nor must he take advantage of it to

press upon his pupils his personal prejudices. If he has, as one of his own ideals, the value of individual thought there will be less danger that his pupils will adopt unthinkingly as permanent the relative standards of school age: "The function of reason", says Sir Percy Nunn, "is not so much to discover truth as to confirm or explore some faith of our fathers".¹ And again, "It follows that the teacher is as much entitled to influence his pupils by suggestion as they are to influence one another, provided he does not deliberately impose such influence upon them, but simply puts his superior knowledge and experience of life into the common stock from which the growing minds of his little community may draw, each what it needs".² 'We may remind ourselves that what we call 'suggestive ideas' owe their value to the possibilities of individual exploration which they open up, rather than to the weight of authority with which they are brought forward. Extreme suggestibility is regarded as being a deterrent rather than a help in individual progress, while contra-suggestibility is recognized as equally prejudicial to rational advance. Between the two lies the readiness of the normal child to accept suggestion unostentatiously conveyed, and to respond with increasing eagerness to stimulation of individual discovery.

Experiments devised to test the suggestibility of children have revealed marked individual differences in its degree. We do not know how much of these differences may be ascribed to innate endowment, but we do know that the nature of the environment

¹ *Education, its Data and First Principles*, page 127.

Ibid., page 128.

supplied does much to exaggerate them. Of this environment the parent and teacher are the chief agents in respect of deliberate suggestion, and it is for them to determine how best to secure not only that the effects of such suggestion shall be valuable at the moment, but that it shall function as a real 'half-way house' to the control of reason.

Punishment.—Discipline in schools is connected inevitably in the mind of the teacher with the question of punishment, and this is true, however lofty may be the ideals of freedom and the conception of discipline to which we may adhere. We said at the beginning of the chapter that a divorce between the two aspects of discipline leads to an exaggeration of the rôle of punishment and repression. But even without such a separation difficulties arise in the best regulated class-rooms as they do in the most wisely-governed nurseries. Rules of conduct are devised to reduce to a minimum the possible disturbances. That these rules should be as few as possible is a common maxim, and another is that having once laid down a rule the teacher must see that it is kept. For infringement certain penalties are designed and ideally these penalties should be immediate, should follow upon the nature of the offence and should be wholly free from expression of personal hostility on the part of the teacher. It is customary to draw a distinction between the deterrent and retributive aspects of punishment, to allude to the one as positive and the other as negative. In an early chapter of the book we gave as an illustration of the substitute response mechanism the replacing of the initial response of stretching towards a lighted candle by an avoidance

reaction consequent upon pain experienced. In its in personal scientific rigour such an alliance between cause and effect may be taken as the prototype of punishment. But physical pain, except in slight degree and incidental to the activity, cannot be regarded as the most advisable link between cause and effect. Administered by the teacher or parent it becomes for the most part significant of hostility, and is in fact rarely divorced from the expression of irritability which is associated with retribution. The most useful form of 'natural consequences' for the school are the isolation from activities which are disturbed, the repairing of material damage inflicted, and in general, the incurring of a like inconvenience to that caused by the offence. "The most severe punishment", says Mr Bertrand Russell, "that ought ever to be necessary is the natural spontaneous expression of indignation."¹ To achieve this result demands a high degree of understanding between teacher and pupil. Such understanding comes by slow degrees, and while awaiting its fruition the teacher is well advised to preserve, in the punishments he inflicts, detachment from hostility and an absence of prolonged reproof. In the minor disturbances of the class-room it is best to refrain from threats or homilies, while in regard to more serious offences such expedients are powerless to attack the underlying causes.

Self-Government and Free Discipline.—If the rules are to be as few as possible they must also be such that their import is clear to the children who are to keep them. In schools where 'self-government' in

¹ *Education*, page 134.

modified form is practised the rules are drawn up jointly by the school staff and pupils' representatives. In such schools the onus of seeing that the rules are kept falls mainly upon the older children and they administer justice for the most part along more rigorous lines than do the teachers themselves. We cannot enter here upon a discussion of the relative merits and dangers of the extension of self-government in schools. It rests in theory upon the irreproachable principle that children, like adults, can only appreciate fully the complex workings of the school commonwealth if they share in the responsibility for its construction and administration. But just as we do not expect the young child to grasp the principles of constitutional history so we cannot hope that he will assimilate more than the rudiments of the complicated interactions of forces within the school community. He has to learn gradually the requirements of a social order, but when these requirements have been learnt by experience he is quick to appreciate their general applicability. Mrs Susan Isaacs has found in her experience that young children brought up in the freest conditions express in play a form of almost tyrannical authority which she believes to indicate the child's demand for adult control imposed with severity. It may be that in the presence of such authority he feels his background more secure. For the conscientious believer in freedom for self-expression in the young child it is not easy to decide the most satisfactory limits of imposed authority. In matters of habit, whether of cleanliness, tidiness or politeness, he feels justified in requiring a uniform adherence to the standard set, although in regard to politeness

and sociability he is careful not to multiply the occasions when sophisticated behaviour is exacted.

We shall have later to discuss the elements which contribute to the successful functioning of the group. It is essentially as the child comes to more personal awareness of the values of group solidarity, with its consequent limitations of personal freedom, that he becomes able to appreciate the necessity for group laws. Such awareness is maturing slowly during the years of primary education and should find a corresponding expression in the type of discipline required.

Free discipline and self-government are associated together in a phraseology which reconciles the apparent contradiction of the terms. Discipline at its freest is seen in the Montessori room of the infants' school and in the sixth form of the secondary school; in which we may find a parallel to the predominance of self-government in the upper part of the secondary school and in the more progressive institutions for the care of delinquent adolescents. With very young children discipline is free because we believe the demands of self-expression at this stage are far in advance of the possibilities of co-operative activity, and because freedom of bodily movement is the most essential factor in intellectual education at this stage. Social behaviour is learnt as a necessary condition in the service of individual expression. With the boys and girls of the sixth form discipline is free because they are assumed to have mastered that other aspect of discipline in the sense of inner control, towards the discussion of which we are now moving. They, the young adolescents, may find in the 'self-government' of the school an instrument by which

they can measure their developing interest in the more abstract principles of justice and beauty as expressed in group activity, while in their share of personal responsibility for younger children they touch on solid ground in a world which is losing some of the stability with which later childhood had endowed it.

Within the range of the elementary school, age and stage of development make a compromise essential. One can however see in schools in the poorest of neighbourhoods girls of thirteen shepherding the younger ones and carrying out duties with a degree of responsible efficiency which would rarely be found in children of the same age in a secondary school. It is not difficult to find in this relative maturity a reflection of the premature responsibility which home circumstances, the care of younger brothers and sisters, and the imminent approach of wage-earning status have imposed. We may sometimes wish to see a reversion to childish naughtiness, but we have to recognize that such children are projected by circumstances into an attitude of adult responsibility at an age when their more fortunate contemporaries may still indulge in experimental building without disaster. The curriculum for the upper classes of the elementary school shows evidence of a wise design to bring within the reach of the 'school leavers' some measure of æsthetic enjoyment. Since the time at the teacher's disposal is short and the claims of vocation are urgent, this is most effectively done through the medium of practical constructive work. Those who have been fortunate enough to see such work in progress in the schools of some of the poorest neighbour-

hoods must feel amazed at the results which are achieved in the face of such serious disabilities.

Psychological Basis.—This preliminary survey of the problems of the class-room may serve to illustrate how impossible it is to sever questions of school discipline from that wider conception which embraces the whole growth of character. If discipline is to be understood as "the attempt of the worker to control what is ineffective" we must be able to appreciate the lines along which this developing organization takes place. The teacher must know something of the individual differences, whether in respect of native endowment or environment, which lead to the more obvious maladjustments of the difficult child. The brief investigation into causes of backwardness and individual differences in learning ability, which we made in the last chapter, would appear insufficient to cover disciplinary problems. So-called good behaviour must then be dependent upon factors so far omitted or insufficiently explored in our discussions, upon emotions, sentiments and ideals which are bound up with the problems of intellectual and moral growth.

The teacher of a class knows well that, in his contest with possible inattention and restlessness, he may be up against factors which have their roots in aspects of the child's life not immediately connected with his life in the class-room. Indolence and inactivity are believed to be unnatural in the child, but their frequent appearance in school suggests that we should try to understand the forces which have produced them. And if we turn to the more serious disorders of the class-room—open rebellion, lying and stealing

on the part of individual children, we are learning to know that such offences are manifestations of conflict which can best be understood and treated in the light of scientific knowledge of their possible causes. We are told that the best discipline is one which will function beyond the school walls, and the teacher is urged to spare no effort to secure continuity between the code of the school and that of the larger world. "He may base his class discipline upon the general requirements of courtesy, fair dealing, natural consideration and that give and take which is demanded of all members of a group engaged in co-operative enterprise."¹

If methods of teaching should follow methods of learning, so the evolution of discipline must follow the lines of emotional development, upon the basis of which individual character is constructed.

REFERENCES

- NUNN. *Education, its Data and First Principles*, Chapter XV.
 WARD AND ROSCOE. *Approach to Teaching* Chapter V.
 BERTRAND RUSSELL. *Education*, Chapter IX.
 STURT AND OAKDEN. *Matter and Method in Education*.

¹ *The Approach to Teaching*, page 52.

CHAPTER XIV

THE SIMPLEST UNITS OF CHARACTER

We are to regard character as a resultant of many factors and the teacher as at least a partial instrument in controlling these factors. In our investigation of the learning process we found it useful to consider the simplest units of learning, and in this we were helped by the experiments undertaken in learning in animals. It is not unfortunately possible to draw like parallels in the case of character since the continuity which we emphasized from the lowest to the highest forms of learning is less in evidence on the side of those complex products which we call character and personality. There are nevertheless a few initial considerations which may be claimed as justifiable parallels between the growth of learning and the growth of personality. In the case of the former we emphasized the fact that development is based upon a few simple unlearned reactions which become rapidly modified through practice in a rich and varied environment. So also we must regard character as based upon a few simple emotional reactions which in turn undergo modification and expansion through the agency of a controlled environment.

Fundamental Emotional Reactions.—In the early chapters of this book we alluded to 'fear, rage and

love' as the three earliest patterns of emotional reactions, and in Chapter V we sketched very briefly the earliest probable extensions of these in connection with the family and the parallel growth of the child's awareness of himself. It is then to these three factors that we must look for the simplest units of character. To them must be added a few other fundamental forms of activity with accompanying emotional affect which make their appearance at a very early age and which are included by many psychologists under the heading of instincts. If we turn now to the specific consideration of the part played by fear, rage, and love we shall obtain some insight into the complexities of emotional development and into the corresponding complexity of human personality. Incidentally it must be remarked that the grouping of fear, rage and love does not suggest that of these fear is the most important, although the systems of discipline in the home and school for the young child, and the code of laws of country for its inhabitants, have been wont in the past to embody a perhaps exaggerated respect for the rôle of fear in behaviour. Two general points may here be made. It is because these forms of activity function from such a very early age and become associated with so many constituents of the environment that they preserve throughout life a preponderant influence and, in their earliest manifestations, are apt to persist in an apparently illogical manner to the possible serious disturbance of normal activity. The second point, to which allusion has already been made in Chapter V, is that the requirements of a civilized society are frequently in conflict with the working of primitive impulses. One of the

problems of education both in the home and in the school is to secure this modification with the minimum amount of disturbance and the greatest possible benefit to the personality of the child. The term 'sublimation' is used to denote this transfer of aim and it implies that the energy attached to early impulses is redirected into more social channels. It aims at a regrouping of the factors concerned leaving the emotional satisfaction unimpaired. Effective sublimation is not easy, and there is a danger of apparent acquiescence in the demands of the educator, a superficial interest in the values suggested, while the emotional element remains attached to the primitive sources of satisfaction. The petty delinquencies common among children are often traceable to some such conflict unsuccessfully resolved. It is necessary then that the teacher shall not speak lightly of sublimation, but shall endeavour to understand the probable lines of development in respect of the fundamental emotional patterns.

Fear.—There is reason to believe that many of the so-called natural fears are in reality acquired and due solely to environmental agencies. We saw that Watson found two stimuli only which would spontaneously evoke signs of fear in the young child. These were a sudden loud noise and loss of support. But we saw also how he induced fear of a furry animal in a child who had hitherto shown no fear in its presence. His argument was to the effect that most of the fears of childhood are 'conditioned', that is they are brought about by association either accidental or deliberate of any stimulus with one of the recognized fear-producing stimuli. There are on the other hand

psychologists who believe that certain racial fears are inherited and who claim that animals show spontaneous signs of fear in the presence of a danger of which they have had no previous experience. It is not, however, necessary for us to follow these arguments further. It is sufficient for us to observe that most children have acquired a considerable number of fears at a comparatively early age; and that many parents and teachers spend time in inculcating fresh fears in the name of discipline, while trying without much success to dispel other fears of which they themselves may, perhaps unconsciously, have been the cause.

It is well known that primitive fear may result in flight or in immobility, and is often accompanied by a cry for help. But in any case it generally serves to inhibit one course of action even while it may speed up another. It is because of its inhibiting effect that fear has come to be looked upon as essentially a deterrent and consequently as an important factor in discipline. We have already touched upon the purely negative and destructive colouring of a discipline which relies on fear alone. We have alluded to the theory of natural consequences which asserts that such consequences, arising automatically from a course of action, will by a simple process of association often serve as a deterrent from a repetition of the offence. Such an acquired fear of consequences is of course rather far removed from spontaneous fear. The objections to a deliberate and extensive adoption of the principle of natural consequences have also been indicated. They centre round the probable disproportion between the consequence and the offence, and there are not many to-day who would agree

with Locke that the child who refuses to change wet shoes must be allowed without further interference to suffer the serious illness which may ensue. But if one could have the power of the Mikado to regulate the punishment, then the claim of natural consequences would be assured. Its appeal lies in the impersonal nature of the punishment, and it is clearly a valid inference that punishment should be divorced from personal hostility.

The emotional element, whether it be fear or anger, must not become tied up with the person of the educator. To such frequent emotional association may be traced many outstanding maladjustments during school life, and the effect is liable to persist and to make itself felt in after years in apparently irrelevant situations.

But we appear to have digressed from our original treatment of fear. The digression arose from the inseparable connection which has arisen between fear and punishment. Fear, as we have seen, has been exploited in the past. What then should be the attitude of the modern adult towards fear both in himself and in children?

"Fear", says Woodworth, "we do not learn, but we learn what to fear." To learn what to fear implies that in so doing the individual learns how to avoid the situation and how to cope with it when it has arisen. This product of experience has then little in common with the paralyzing, often quite irrational, fears which persist often into adult life. As the child grows older and as his control of the environment grows correspondingly greater we may expect that the number of objects of fear will diminish. On the

other hand his increasingly wider explorations of the world around will of necessity bring him unpleasant and unexpected experiences in which the seeds of future fear may be sown ; and it would appear that the child comes to fear more rather than less, too much rather than too little. Love is often urged as the vanquisher of fear, but it may perhaps be submitted that knowledge also has a major share. The fear of the unknown is conquered when the mysterious becomes familiar, and it is to progressive manipulative control that we must look for the most hopeful escape from many of our fears. The fear which many of us experienced on first attempts to dive for example was dissipated as we learnt better how to do it, and the whole treatment of swimming and its concomitant fears is an excellent illustration of the gradual elimination of partial fears by partial control. The reader is referred to the chapter on Fears in Mr Bertrand Russell's book on Education. His advice is condensed into the maxim " Deal with irrational fears by familiarizing the child with the fainter elements of the situation ", and he explains how he used this method with success in the case of his own small boy's fear of shadows.

Children differ very widely in their range of fears, and it is often difficult to account for the origin of a particular fear in a child whose environment has been carefully controlled. If the origin can be discovered it is helpful in suggesting the contrary line of unwinding the tangle which has led to the fear situation. In the hands of a skilled psychologist the origin of most irrational fears can be disentangled, and when a child is suffering from severe emotional disturbance and intense irrational fears it is better to obtain expert

advice rather than to trust to the effect of time in allaying fear. Experience would seem to show that not only does time alone rarely allay fears of such intensity, but that their devastating effects persist even after the apparent symptoms have ceased.

The universal praise of courage must often seem strangely incompatible with the parallel exploitation of fear. Initially useful, fear must be encouraged to give place gradually to the joy of successful activity. The teacher has often to contend with a régime of fear established before the child comes into his care ; he will dissolve this best not only by refusing to continue to exploit the fear motive, but by encouraging and offering opportunities for the tempered courage which comes from knowledge.

Anger and its educational significance.—Fear we found to be a definite reaction evoked by a positive stimulus but destined essentially to play a negative rôle. Anger on the other hand would appear to be evoked rather by the thwarting of an original activity than by some specific stimulus, and yet its rôle becomes increasingly positive and, under guidance, constructive. We read of "instinctive pugnacity" being sublimated into perseverance and high endeavour. Clearly it is a far cry from the baby stiff and purple with rage to the explorer fighting the elements with indomitable perseverance, and in respect of the sublimation of anger, the educator has in truth a difficult task. For not only is it a question of changing the object of anger from the immediate and personal to the remote and objective, but the manner of its expression must likewise undergo radical modification.

The baby resents the thwarting of his freedom of

movement by imposed restraint from a very early age. Few of us can resist a spontaneous expression of anger when we are pushed aside and ousted from a laboriously acquired place in a queue for landing from a boat or when, as we try to get out of an omnibus we are thwarted by an incoming mass of people. Interference with our freedom of movement is never accepted readily, more particularly when the obstacle is another individual. The child in his growing acquaintance with the world meets many such obstacles, and other human beings are apt to be the most immovable. We can readily understand that when the obstacle is one which increased endeavour can surmount, then the pugnacity which results in such additional effort is a valuable asset in acquiring control. It is however difficult for the child to dissociate the desire for removal of the obstacle from the desire to inflict pain upon the offender. To kick the chair which has injured one's shin relieves a certain amount of tension, and few people dispense entirely with a parallel expletive, however mild. But when the obstacle is a human being and in particular a human being to whom the child must look for much necessary help in the complicated business of living up to requirements, then the mixture of love and hostility may lead to permanent conflict. In this respect the child will take his cue to a large extent from the adult concerned. In speaking of fear, and punishment, we emphasized the necessity for dispassionate treatment. Still more is it necessary that the adult in charge shall sedulously avoid recrimination and personal hostility in the thwartings which he feels impelled to impose upon the children in his charge.

A spontaneous expression of anger at cruelty or injustice may be justified and effective upon occasion, but long-drawn-out resentment and coldness are weapons which the child is not competent to meet.

It is doubtful whether the most careful education will eradicate self-centred anger at the thwarting of our desired schemes of activity; and most people would agree that it is undesirable that it should do so. But a young child may learn to laugh at his own outbursts, and to accommodate his activities to the requirements of society at least to such an extent as will avoid a complete rupture of peaceable relations. Here again much is done by suggestion, and the atmosphere of these inevitable clashes is created largely by the more powerful adult. The teacher in school has sometimes to deal with a serious outbreak of 'temper' on the part of an individual child. Given the somewhat restrained atmosphere of even the freest school, and the weighty effect of the public opinion of twenty or thirty contemporaries, it is probably safe to say that a serious outbreak of anger on the part of an individual child has its roots in a serious cause. The writer was as a student nonplussed by a sudden outbreak on the part of a young boy of eight years of age. He was a clever boy and no untoward incident had apparently occurred. But suddenly he attacked the children to right and left and burst into tears. But what was to her even more astonishing was the immediate response of the other children in the class. One small boy said at once, "When he's like this, Miss W—— (the form mistress) sends him out to walk round the garden". George, the boy in question, immediately rose, went out and

returned in a short time serene and restored. He was over excitable and towards the end of a busy morning the accumulation of stimuli and fatigue had proved too much for his control. What is perhaps worth emphasizing in this example is that as a result of wise guidance on the part of the form teacher, the children in the class, even at the early age of eight, already showed tolerant understanding of George's difficulties, whereas George himself had learnt the simple and effective method of treatment, divorced from false shame or from equally false sympathy.

Group rivalry is considered to be more ethically advanced than competition between individuals. Sports and games are held to be legitimate fields in which pugnacity can work itself out in healthy exercise. It is not necessary to sketch the value of team games, nor of the extension of house and team rivalry into the lessons of the class-room. But there is perhaps a danger that the striving for the group may be unduly exalted since it is apt to assume a necessary rival other than oneself. In a previous chapter we suggested that the child might be encouraged to concentrate upon beating his own previous records in a given performance. In a discussion of the educational advantages of anger we may emphasize ignorance and oppression as worthy objects of pugnacious attack, and may refer to Mr Bertrand Russell's plea for inorganic matter as the most stimulating enemy. "I do not", he writes, "want to lay too much stress upon this consideration because competitiveness is natural to man and must find some outlet, which can hardly be more innocent than games and athletic contests. This is a valid reason for not preventing

games, but it is not a valid reason for exalting them into a leading position in the school curriculum. Let boys play because they like to do so, not because the authorities think games an antidote to what the Japanese call "dangerous thoughts".¹ We need not enter here into the vexed question of the relative value of organized school games. In the elementary school, at least, there is no danger of over-emphasis in this respect. It is only in comparatively recent times that games have entered into anything approaching their true position. One has only to watch the children of a school in a slum neighbourhood surmounting with enjoyment the difficulties of heavy boots and unsuitable clothing in a games "lesson" to feel that their keen appreciation of what is done is at once a justification for their inclusion and an indictment of the policy which left them for so long out of account.

Anger in the service of a remote end is only possible at a comparatively late stage of development when the more complex units of character which are known as sentiments have reached a relatively advanced stage of conscious organization.

Love.—The emotional reactions which are classed under the heading of love stretch in many directions and embrace apparently diverse activities. The earliest manifestations in the young baby may seem far removed from all that the term in general connotes. Watson gave the name of love to the signs of pleasure produced in the baby by tickling or caressing. The smile of the child who is happy, fed and comfortable is directed towards the mother or ministrant who secures this result. Early in life the emotion becomes

¹ *Education*, page 104.

organized round the person of the mother and is extended to other members of the family. We alluded briefly in Chapter V to the paramount importance in the life of the child of pre-school age of the emotional environment provided by the family : The problem for those concerned with the care of the young child is to secure that while on the one hand he is guaranteed the affection which is his due, he shall not on the other become so bound in emotional dependence on the members of his immediate circle that he is unable satisfactorily to extend his loves as his circle widens.

We are indebted to the researches of Freud and his followers for the illumination of unsuspected difficulties in this early love-life. Many of the conflicts of later life are traceable to lack of harmony in family affection. It has been the custom to rebuke a child for signs of jealousy, and to restrict ourselves to condemnation of it as a reprehensible trait. In the light of modern knowledge such an attitude is no longer tenable. Investigations into the type of situation which first arouses jealousy in the young child have not yielded unanimous results, but all who have the care of children are familiar with the essential features of such situations. They are in brief the transference of attention to another, and even though such transference may be momentary and in the interests of politeness it is apt to be interpreted by the child, as indeed by adults, as significant of a parallel transference of affection. While clearly it is necessary that all individuals shall support with equanimity a temporary relegation to obscurity, it is on the other hand equally important that the young child shall not be left to suffer alone the complete withdrawal of

support which this to him implies. It is essentially in virtue of acquired interests and philosophies that we are able to hold to serenity in the midst of conflicting loves and hates. The young child requires our active help in forming these interests and allying them to his former loves. The illustration which at once suggests itself is the attitude of the child towards the birth of a younger child. In an ordinary household this event involves of necessity the withdrawal of some portion of the attention what has previously been the only child's exclusive right. The wise mother enlists the interest of the child in the prospective birth, and endows him with at least an apparent responsibility for the welfare of the new infant. This should in ordinary circumstances produce a "mothering attitude" from the elder to the younger child. But it is not easy to divine what passes in the mind of a child on these occasions. A little boy, known to the writer, said shortly after the birth of a young brother when he himself was seven years old, "You know, David is very poor; he would have no money if I didn't give him some of mine." The infant David was in this connection seen rather as an object of commiseration than of envy, and the protective attitude of his brother's generosity implied at least an apparent extension of family love and solidarity.

In learning to submit to the baby's attacks on property, and interference with play in progress, the small child receives one of the most severe lessons in social adjustment. The fact that the baby belongs to him makes a difference. It is still more difficult to suffer with serenity the depredations of contemporaries upon one's private property. Beyond the

circle of his family the child's love proceeds more readily to his own toys and pets than to the human race at large. This property is an extension of himself, and common as opposed to private property is a difficult conception.

We pass naturally from this point to the consideration of some of the distinctions which it is customary to draw between forms of love. McDougall distinguished as separate the sex and parental instincts. Popular opinion regards as diverse the love of the man for the woman, of the parent for the child, of the scientist for his research. The psycho-analytic school of thought prefers to group together all forms of love manifestation and, under the heading of sex, discusses activities which seem far removed from mating. Whatever may be our personal feeling towards the question of terminology we may gain much from the attitude which emphasizes continuity rather than separation, and which helps us to realize the formative importance of the child's early emotional life. As with fear and anger, the important point is what the individual loves. Theoretically all will agree that it is well to love parents, husband or wife, children, oneself, the world at large, and the recognized virtues, that it is natural to love pleasure and variety, in moderation, and to grade one's affection in intensity from those nearest to those more remote ; and that when all is said it is improbable that the affections of any of us will ever be under perfect control.

We may pause here to review two points which stand out even from this preliminary survey. In the case of fear, anger and love we have to consider always the object to which they are attached and the course

of activity to which they lead. The first point suggests that if these native reaction patterns are the simplest units of character, they soon give place to more complex units consisting of the emotion in question organized round an object. Such an organization we shall discuss more in detail in the next chapter under the heading of sentiments and complexes. The second point suggests that emotions are the most powerful instigators of action and that the educator who is concerned with a diversion of object must look to it that he does not paralyze activity.

REFERENCES

- BERTRAND RUSSELL. *Education*. Chapters IV, IX, X, XI.
STURT AND OAKDEN. *Educational Psychology*. Chapters VII and VIII.
THOMSON. *Instinct, Intelligence and Character*. Chapters VII-XV
BURT. *The Young Delinquent*. Chapters IX and X.
WOODWORTH. *Psychology*, Chapters VI, VII, VIII.

CHAPTER XV

THE ORGANIZATION OF SENTIMENTS

Definitions.—A sentiment is defined technically as “a system of feelings, that is of emotions, appetites, and desires organized with reference to a particular object and having a considerable degree of stability”. Freud defines a complex as “a circle of thoughts and interests of strong affective value of whose influence at the time nothing is known to the subject”. The layman will connect either term with what he in general alludes to as interests. Professor Burt summarizes the relationship existing between the three. “For these acquired dispositions, into which instincts and emotions, habits and ideas become progressively built up, the simplest and most intelligible name is ‘interest’. Interest indeed suggests a somewhat intellectual concern for somewhat impersonal matters, and is, therefore, not the psychologists’ own term. Contemporary psychology prefers, in this country, the term ‘sentiment’, thus indicating that a personal rather than an abstract character is really distinctive of the most prevalent and most fundamental interests. More recently still, upon the Continent, psycho-analysts have introduced the word “complex”—a word, however, which in its stricter use is a term of psychological medicine, and denotes a system of ideas and

tendencies that are in part repressed and have in consequence a pathological or morbid 'tinge.'"¹

Confusion of Motives.—The teacher in the class-room is accustomed to regard interest as his most valuable ally and to expend much thought upon the means of enlisting it. Sentiments he probably connects mainly with a range of loyalties, while complexes, except in so far as the term has become incorporated into jocular parlance, he regards for the most part as outside his purview. If he substitutes interests for interest and is willing to take account of emotional bearing he will the more easily be able to regard as a whole the personality of the children in his care. We were at pains to emphasize in the early chapters of this book the essential unity of knowledge and action and within this unity emotional reaction must find a place. Nor indeed must it be considered as a secondary place. At the close of the preceding chapter we alluded to the rôle of emotion as an instigator of action. The analysis of emotion and of its function as a drive to action is one of the most difficult topics which modern psychology has to investigate. Without however entering into the intricacies of this field, we may easily from our own experience verify a few essential points. Under the influence of a strong emotion, fear, rage, or love, we find ourselves at times carrying through a course of action normally quite outside our usual range of possibilities. At other times under the influence of these same emotions we find ourselves equally unable to continue in a rational manner an activity which is dictated by prudence or self-interest. Under the influence of hunger, codes of

¹ *The Young Delinquent*, page 538.

manners and ideals of unselfishness are apt to be disregarded, and this we admit the more readily because we have probably never been called upon to verify it in our own experience. But if we face the problems of our lives with any degree of intellectual honesty we are brought up against instances of conflict between the acquired ideals which are the product of education, and individual drives to a course of action which part, at least, of ourselves deplores.

It is a useful exercise to review the motives which we believe to have actuated our conduct at different stages of our existence. Even so it is not easy to be sure that the motives we assert were in reality the true ones. The adult is probably more honest about his motives when he was a child than he is about his present actions. With this in mind we can more easily understand the prevarications and self-deceptions of the child who presents what is to him a convincing 'excuse' for some delinquency. We recognize that as children we were more often deterred from the 'wrong' by fear of punishment than addicted to the 'right' by principle, that if we could have stolen with impunity we should have done so, and that tale-bearing and lying were rather stamped out of us by force of public opinion than eradicated through an inner state of grace. Some of us may remember a rather weighty and inconvenient conscience associated with the figure of a parent grieved, behind whom sheltered an avenging deity. We may recall also a feeling of injustice against the unreasonableness of those who expected us to be good and the sense of rather awed relief on those occasions when we decided

that for a few days at least we would let things rip and hang the consequences. While we were never quite sure of why we were expected to do this but not that, we acquired by degrees an empirical code upon the basis of which we managed to preserve an external acceptable demeanour, which left us free to devote our thoughts to the things which mattered to us. By degrees we learnt to distinguish between those acts of overt 'naughtiness' such as negligence of property which were punished and done with and the more mysterious improprieties which we never fully understood, but which involved not only a present rebuke but the loss of caste for some time to come.

Looking back we can see that not all the care and wisdom which were placed at our disposal by solicitous adults would suffice to prevent the confusion of values which so often oppressed us. We can trace the growth and shifting of these values, working gradually towards a code which has for each of us its individual significance.

Sentiments.—It is such values which form in time the sentiments which dominate our lives. Amongst them we can distinguish those to which, approved by the society around us, we give a rational if lukewarm adherence, others for which we feel a less rational enthusiasm and still a third group which we feel we have made peculiarly our own, which are interwoven inextricably with our personal experience, and to which the approval or disapproval of others are alike powerless to shake our devotion. All these sentiments are acquired and have sprung from the crude emotional reactions of the child. Ethically

neutral in their first manifestations they have become through association with objects and chains of circumstances the final indications of right and wrong. We can trace in all the share of love or of hate and in most some degree of fear, of anger, wonder, or disgust. The student is referred to McDougall's hypothesis of the development of the 'derived' from the 'primary' emotions, and to Shand's treatment of the organization of sentiments. His 'Foundations of Character' is the classical authority on this subject. For our purposes it must suffice to touch upon only a few of the more easily understood sentiments. The earliest of all is, as we have indicated, that for the mother, and this embraces early the rest of the family. The individual develops a sentiment for any group to which he is attached by inclination and common purpose. If he feels at one with the aims of the group, or if he takes over easily the body of tradition which surrounds it, he responds with loyalty. The organization of one's several loyalties is the mark of one's progressive development. We speak of one succeeding another, but it is in general rather a taking over than a supercession. The claims of conflicting loyalties present frequent problems, more especially to the young adolescent, and it has to be recognized that 'unswerving loyalty' to an old ideal is not of necessity the mark of strength. Some sentiments we discard with a smile as the accompaniment of childish things, others appear to die for lack of nourishment, and to others we become so much accustomed that we are inclined to regard them as habits rather than as sentiments. Interference with the water supply by a sharp frost will reawaken a genuine sentiment

for cleanliness of which perhaps we have not been actively aware since the momentous stage of childhood when washing ceased to be a burden imposed by arbitrary external decree.

The Self-Regarding Sentiment.—There is however one sentiment which never loses its hold, but which becomes progressively stronger and more closely knit. We refer to what is called by psychologists the "self-regarding" sentiment. In an earlier chapter we alluded to the child's momentous discovery of himself as different from the surrounding world. This discovery once made, the rest of experience falls into place as contributing to the enlargement and refinement of a self which is at the same time actively experiencing and an object of criticism or appraisal. In the larger view there will be little danger of identifying this sentiment with selfishness. The evidences of conflict are too real to warrant the assumption that immediate gratification is the sole aim of the self-regarding sentiment.

It is in the last resort to the conception of one's self as the critic of one's activities and achievements that appeal is made. Honesty of self-criticism is a function of intelligence and of acquired ideals. Most of the contributory ideals will have been taken over originally by suggestion, and subjected later to individual judgment. But reasoning in respect of beliefs and ideals is only partially independent of the background of particular experience. Thwarted activity, or unsatisfactory emotional life may produce a 'self-regarding sentiment' in which self-pity or self-depreciation are prominent features, while a corresponding lack of objective standards may lead

to an exaggerated conception of oneself as a dominant power. Self-pity is essentially a sterile attitude while exaggerated self-esteem is equally unprogressive. Much has been written on the organization of sentiments, well calculated to stimulate the reader and to guide the teacher in his share of their development. From Sir Percy Nunn's illuminating chapter on the 'Growth of the Self' we may select the following passages—

"Among the expanded structures we must take special note of what McDougall calls the 'self-regarding sentiment'. In early life our sentiments are almost as 'objective' as the animals. A greedy little boy aims at the largest share of the chocolates as simply as a greedy little dog aims at getting the largest share of the bones; a little girl in a pretty new frock indulges her positive self-feeling almost as naively as a peacock exhibiting his tail. Even in adult life such objectivity remains possible; a man may often be so much absorbed in the immediate object of his activity as to forget everything else. But in quite early days man, as distinguished from other animals, begins first to recognize, then to appreciate himself as an actor in his life's drama."¹

And again—

"It is an ancient and profound truth that education should teach men to love and to hate the right things; but the aphorism must not lead us into the error of supposing that love and hate are of co-ordinate value. A love, since it urges one to explore and develop the riches of its object, is a principle of growth, of expansion: a hate, since its aim is to destroy relations with its object, is, so far doomed to sterility."²

¹ *Education, its Data and First Principles*, page 154.

² *Ibid*, page 144.

The Teacher's Task.—What exactly, we may ask, is the teacher to do in this matter of the cultivation of sentiments? Let us assume that he is reasonably well informed as to the origin and probable development of the child's early loves; that he is sensible of the conflict between the claims of present desires and of remote social values. While he may be actively concerned to make the child a good citizen of the world, and to help to resolve his more pressing conflicts, he knows at the same time that each individual must in effect work out his own salvation, and that a premature short-circuiting of moral experience is apt to bring its own confusion. He may himself have a deep-seated respect for individual expression, and regard the possession of his own soul as the hall-mark of the righteous man. He believes nevertheless that, somehow or other, the influence of the school is an active agent for the furnishing of ideals and modes of conduct for the children within it.

On analysis he might recognise certain well-marked features in respect of which the influence of the school is most clearly exerted. These he might tabulate under the headings of

- (a) influence of contemporaries ;
- (b) influence, direct and indirect, of teachers and older pupils ;
- (c) influence of some indefinable quality known as the ' tone ' of the school ;
- (d) the influence of direct moral instruction ; and
- (e) the influence of growing intellectual control of environment.

For the purposes of discussion this list of features may serve as well as any other as a jumping-off ground for the things which must be said in their regard. Under the first two headings so much can be said that it is best postponed until a later chapter. The influence of growing intellectual control upon moral values can only be rightly understood in connection with the 'play' as well as the school 'work' of children, and the consideration of play is itself closely linked up with the discussion of group activities. We may however insert at this point a short note upon the question of school tradition and direct moral instruction. Tradition is essentially the outcome of group activity, which has become crystallized in respect of certain well-marked formulae. It is considered to be a more powerful agent than direct moral instruction in securing the adherence of the community to a desired code. It depends for its success largely upon the power of suggestion to which allusion has already been made. Suggestion is in this respect supported by a large mass of 'public opinion', whereas direct moral instruction must rely upon a more remote authority. For these reasons the teacher aims at making moral instruction incidental, and related to present needs, but at the same time seeks to vivify tradition by suitable emphasis of its setting, not only in connection with the particular school, but in relation to those aspects of wider human enterprise with which the child is familiarized in past, or touches in present, history. We do not want either tradition or moral instruction to become a dead weight and impediment to individual progress. We wish the child to assimilate attitudes rather than details of

performance, to give him some measure of present security through which he can work his way to a more permanent stability.

The Teacher in Relation to Complexes.—We have in this chapter emphasized the sentiment rather than the complex. The one is constructive and is built slowly upon widening experience. The complex, on the other hand, is to be regarded as a destructive agent, since it interferes with the individual's grasp of present reality. The teacher has a positive function in respect of the cultivation of sentiments, and can ally his own power of suggestion to the material situations provided by the school. It is not to be expected that the class teacher can have a correspondingly important rôle in the resolving of complexes set up in pre-school years. He should however know something of the mechanisms by which conflicts are initiated and avoid as far as possible contributing to their intensity.

We are accustomed to regard serious emotional disturbance as more especially concerned with adolescent or adult life. The teaching of modern psychology suggests, as we have indicated, that the source of later troubles must be sought for the most part in early childhood, and are in close connection with the evolving sentiment for the family. It is in respect of the affection and authority of the parents, of unsatisfied curiosity in matters of sex, and of inculcated disgust in connection with bodily functions, that the most serious conflicts originate. This does not mean that the child is free from conflict in other matters. He is constantly brought up against his own inferiority to forces of the external world, to

the necessity for sacrificing present pleasure to the needs of the community or to more remote personal ends. His self-esteem is continually receiving rude shocks and his activities are thwarted. Much of the consequent pain is regarded as 'wholesome discipline'. It has disciplinary value in so far as it leads towards more exact standards of measurements in respect of skill and pleasure, and it is wholesome in so far as it is free from a sense of guilt or injustice which may rankle destructively for some time to come. The individual who can laugh at himself is, we are inclined to think, relatively free from serious emotional disturbance. But it is only possible to laugh at what we can understand, and bring into the open light of day in words expressed or in acknowledged thought. This brings us to the essential feature of the "complex". It is because the feelings and activities which have given rise to it are not put into words and acknowledged in thought that the complex has acquired its sinister significance. The concept of the unconscious mind has been evoked to express the mechanism of its subsequent influence upon behaviour. In the chapter on memory we spoke of the persisting influence in greater or less degree of all experience, and of the need to distinguish between experience which can be recalled with comparative ease, and that which presents strong resistance to recall, presumably because of repressed emotional context. So that when we speak of an experience being "repressed into the unconscious" we imply that its salient features have never been understood or expressed in words, and that some factor has successfully prevented such expression.

The nature of this factor is in general a sense of guilt or shame, which has been acquired for the most part through suggestion supplied by the home environment of the child. We have already alluded to the importance of not conveying to the young child a feeling of disgust in connection with his quite natural interest in bodily functions. While such interest is natural it is in the ordinary course of events superseded by the large number of other interests which his growing control of the environment affords. Mothers and teachers of young children are advised to give ample opportunity for play with water and plasticine in which medium the interest in excreta can give place to manipulative control of material. An equal care must be extended in respect of the child's interest in sex matters and in his own sex organs. What are alluded to as unhealthy interests or practices in the young child are for the most part the outcome of injudiciously repressed curiosity and the conveyance of guilt or shame. The task of partial enlightenment and of prevention of exaggerated interest in sex matters should be the function of the parents, but if this has not been undertaken at home the teacher often comes in contact with the results of home negligence. It is then necessary that he, the teacher, shall himself recognize the associated factors and shall not contribute, by an attitude of disgust or undue distress, to the confusion and guilt already present in the mind of the child. Sex instruction is provided now in some schools for the older pupils, but it has to be remembered that the most carefully-thought-out biological approach will not compensate in later years for neglect

of wise dispassionate treatment in the early years.

The types of 'complex' with which the teacher is most frequently confronted are the ones known as the 'authority complex' and the 'inferiority complex'. The signs of the one are an exaggerated reaction against authority in any form, and of the other an open shrinking from responsibility or periodic outbursts of aggression which mask the inner sense of inferiority. Such complexes have, probably, arisen from the home situations, from the mingling of fear and affection or from real or fancied neglect, from want of encouragement or opportunity for reasonable self-assertion. In respect of these disturbances the school can play a remedial rôle. Satisfaction at work well done, encouragement of success, a delegated measure of responsibility and trust, are amongst the most obvious compensations which the school can provide. More subtle but probably more permanently effective is the extension of love to the teacher and to schoolfellows from whom the child can secure the appreciation he has so far been denied. If the initial sentiment for the family has been unsatisfactory it is the more important that the school shall provide a corrective background against which the widening organization of sentiments may be successfully accomplished. And in this it is the influence of the groups of individuals within the school which is the most significant factor.

REFERENCES

- NUNN. *Education, its Data and First Principles*, Chapter XII.
 BURT. *The Young Delinquent*, Chapters IX-XII.
 LOW. *The Unconscious in Action*, Chapter V.
 THOMSON. *Instinct, Intelligence and Character*, Chapters XVI, XXIII.

CHAPTER XVI

THE GROUP AT WORK AND IN PLAY

The "Gregarious Instinct."—It is generally recognized that it is bad for children to be deprived of the society of their contemporaries, and that the only child will suffer unless care is taken to provide him with adequate companionship. As we grow older, we, for the most part, like to be with other people, although we value and in fact regard as essential intervals of solitary communing with our own thoughts. The general recognition of the severity of solitary confinement as a form of punishment, and the common spectacle of the crowds in the streets, are sufficient indication of the strength of the desire for companionship. We speak of the 'herd instinct' in animals, and are familiar with the signs of distress manifested by the deer who becomes separated from the rest of the herd. So we find in psychological writings allusions to a comparable 'gregarious instinct' in man, but all which we include under the heading of social behaviour can by no means be ascribed to the undiluted workings of such a primitive instinct. "Let's get together and do something--that is as far as the gregarious instinct goes", says Woodworth. "What we do depends on other motives; and on learning as well as instinct."¹ We have on the one

¹ *Psychology*, page 147.

hand records by scientific observers of the uneasiness giving place to anger or fear of the baby who is left too long alone, and on the other we have personal experience of the impossibilities of co-operative play for any length of time amongst young children. "Do not endeavour to make co-operative shopping exercises a feature of your arithmetic teaching to young children, the young teacher is advised." Each child must be at once the shopkeeper, cashier and customer.

The Organized Group.—And so we are led from these few remarks to the consideration of the difference between the crowd collected by chance, and the organized group bound together by a common purpose. Whole books have been written on this subject, and from them and from our own experience we can extract those considerations most relevant to the teacher's task. We do not esteem highly the quick spread of facile emotion—called by some writers primitive sympathy, which is typical of the crowd in the presence of excitement or under the sway of an impassioned orator. But from this fact we can deduce the quick reflection of our own emotions in the children who are uninformed spectators, and can guard against the exhibition of fear, anger or other forms of emotional excitement in their presence. We can however appreciate the value of common aims understood and shared, and can make it our task to bring these aims to the comprehending awareness of the child. We have already touched upon the influence of suggestion, and the value of tradition. We may however at this point allude once more to the necessity of caution in setting before the child group ideals in which our own personal

prejudice may have an unsuspected share. The young child cannot bring to bear the rational analysis of abstract ideals which is the only sure foundation for belief in matters of which we cannot know in the objective scientific sense. And though the young child will take over uncritically the standards which we set before him, we must so contrive that his developing criticism may be brought to bear without undue emotional disturbance in the years to come. But while he takes over much from the adult in virtue of the latter's power of prestige suggestion he takes over much more from children who are slightly older than himself. Older children are to the younger admired embodiments of virtues not so far removed from the attainable as to discourage emulation. Younger children are to older ones fit subjects for the exercise of authority in the interests of responsible government. But, says Mr Bertrand Russell, "although both older and younger children are important, contemporaries are far more so, at any rate, from the age of four onwards. Behaviour to equals is what most needs to be learnt. Most of the inequalities in the existing world are artificial, and it would be a good thing if our behaviour ignored them. . . . Among schoolfellows a boy has that degree of importance which is accorded to him by their judgment; he may be admired or despised, but the issue depends on his own character and prowess. Affectionate parents create a too indulgent milieu; parents without affection create one where spontaneity is repressed. It is only contemporaries who give scope for spontaneity in free competition and in equal co-operation. Self-respect without tyranny, consideration

without slavishness, can be learnt best in dealing with equals."¹

Group Units within the school.—Within the school are the various organizations which provide the child with the companionship of contemporaries and of older and younger children. The "class" is a unit devised for instructional purposes and rests initially upon an age basis. We suggested in a previous chapter that mental rather than chronological age is the more effective basis of classification, and it is probable also that in the sphere of moral influence contemporaries may best be understood in terms of mental age. Within the class we find "teams" generally distinguished by a proprietary colour providing the smaller group within the larger. They serve chiefly as harmless competitive units providing incentive for higher performance in respect of learning and games, and in the virtues of punctuality, cleanliness and general usefulness in the school. They are, in short, one of the instruments of sublimated pugnacity to which allusion has already been made. In their interest the individual performs feats which, deprived of the incentive of contemporary opinion, he would never be able to achieve. They aim at being at once instruments of co-operation within themselves, and of competition with others. On a different basis and devised for a different purpose, are the Houses which are now found in most of our elementary and secondary schools. It is through them that the individual child comes into contact with his seniors and juniors, and finds a place in a commonwealth which reflects in manageable

¹ *Education*, page 147.

proportions the characteristics of the world around. It is not uncommon to find houses named after characters in history, or fiction, or in the case of older schools after past benefactors of the institution. The names should stand for some tradition of service rendered of which the child can take over the spirit if not the setting. Within the house, responsibility towards younger members, admiring imitation of older ones, and wholesome regard for the opinion of contemporaries stimulate performances which may be far ahead of the sentiments they should in theory express. But just as we learn a form of skill by practising it so we learn a virtue by exercising it, and, as we are so often reminded, social virtues cannot arise in isolation. There is perhaps a danger that amongst the many occupations of the school, the house may tend to become merely a competitive symbol in games or attendance but, in a full time-table, provision can generally be found for house talks and social activities. It is sometimes argued that a child of elementary school age becomes bewildered by the variety of organizations to which he is expected to render service. He may, for example, find himself in a progressive school in which he is a member of a "register class", a house, and at least two different "divisions" if the school is cross classified for purposes of instruction in some of the subjects of the curriculum. His class teacher, house master, and instructors in English and Arithmetic may all be different people. The unfortunate child may feel that he belongs to no one, and may move aimlessly about the school from one to another, in rather striking parody of the French eulogy of English education which found expression

in the remark that the English child "does his lessons when and where he will." Different children will undoubtedly react in different fashion to the groups within a group. The sense of 'belonging', which is indispensable if the group ideals are to be effective, depends very much upon the intelligence and emotional stability of the individual child. A word of caution is therefore necessary lest in the enthusiastic adoption of progressive expedients there is failure to provide the continuity of background which is the right of every child. At this point mention may perhaps be made of the policy of isolation from the activities of the group which finds favour as an instrument of punishment. It would seem a corollary to the doctrine that the individual must contribute to the welfare of the group. If therefore the activities of the group are interfered with by the 'naughtiness' of the individual child he should be debarred from participation in them. Such treatment is in the main effective, since occupations acquire a new attraction when we are cut off from their pursuit. But the practice of sending a child out of the room to brood with resentment upon the injustice involved and to look with apprehension for the coming of a higher authority is definitely bad, since attention is drawn to personal guilt, hostility and fear, rather than to the attractions of shared activity.

Group Leaders.—The organization of a group involves the appointment of officers. Leaders are chosen, generally by the members of the group themselves, while the staff of the school assume a friendly share of direction. Much has been written about the rôle of leadership and the opportunities for self-assertion

which such official positions afford. Most teachers are familiar with the reformation which often attends promotion to responsibility. Even in small matters of class-room routine such as the distribution or collection of material, disaster has often been averted by giving the 'self-assertive' individual something to do. On the other hand the conscientious teacher is anxious also to bring forward the more shy and retiring child, and is afraid lest in delegating authority to the more conspicuous members he may in reality be taking the course of least resistance to secure peace around him. 'Self-assertion' is listed as one of the most important instinctive activities, as representing the necessary attitude of the individual in the face of an alien environment. Allied to pugnacity it furnishes the essential instrument of control. Those psychologists who prefer to consider fundamental activities under the two headings of 'ego' and 'sex' include under the former term all those activities which we think of as self-assertive, and which contribute to the evolution of the self-regarding sentiment. With self-assertion is postulated, by McDougall and others, a compensating instinct of self-submission in virtue of which we yield to superior force. The knowledge of when to yield and when to persist in self-assertion is the product of experience, and we probably never completely acquire it. The young child is constantly brought up against his inferiority to surrounding forces, and from this, unless care is taken to ensure that a corresponding measure of satisfactory self-assertion is available, may result, as we have seen, an "inferiority complex". These things the teacher has to know and take into account

in his task of leadership. In our discussion of "free discipline" and self-government in a previous chapter we alluded to the practice of election of officers by the children themselves. Such officials are chosen by common consent to enforce the rules of conduct devised for the common welfare. The results of such election show for the most part real discernment in the ballot. The leaders so selected are not chosen for easy-going tolerance of offence but for qualities of leadership suspected or proved. One does, of course, find within the class factions which may be compared with the parties of politics, and each may run its own candidate for election, but the result is followed by general loyalty to the leaders selected. Any subsequent outbreaks of factional rebellion are regarded with strong disapproval by the members of the group. Their occurrence, though rare, is a serious symptom, and the help of higher authority in the person of the teacher is required in such an event. We may perhaps insert here a word of caution against the imposing of too heavy burdens of responsibility upon children of school age. This is particularly necessary in the case of young adolescents, occupied with approaching examinations and in the grip of emotional discoveries, which may find expression in over conscientiousness in matters of personal responsibility in school.

The Group at Play.—The groups within the school which we have so far discussed have been the result of adult enterprise. They have been organized with a special purpose in view, and their activities have been arranged to fulfil this purpose. Amongst themselves, however, free from adult interference, children

organize other groups to accomplish what are to them even more important aims. Such groups we see in children's play, and we have to recognize that what we call play is to the children concerned the really serious business of life. In these voluntary associations for purposes peculiar to their age, the real leaders stand out. For the most part self-constituted, their rulings are accepted with implicit obedience and the government is autocratic. We may well pause to contrast this state of affairs with the sentiments for co-operation and self-sacrifice for the good of the whole which have been instanced as worthy ideals of the organized group. The teacher recognizes a distinction between free play and 'organized games'; he knows that he can learn much from the observation of children at play, and he believes the reconciliation of play and work to be one of the most effective instruments of instruction.

The Value of Play.—And on all this much has been written. Some psychologists consider play as a definite instinct, but most prefer to regard it as a mode of expression of any instinctive activity. All are agreed that the part assumed by play varies directly with the length of the period of immaturity of the young animal, and that this connection is not merely one of time but of definite biological necessity. The doctrine of Karl Groos that 'we do not play because we are young but that we are young in order to play' is the most familiar expression of this truth. In a recent book on *The Nursery Years* Mrs Susan Isaacs has summarized the essential points. "But the playing animals, and in proportion as they play, gain something of an individual wisdom. They are

the curious, the experimental animals. The young lamb skips, but only for a short time, and soon settles down into sheep-like stolidity ; whereas the kitten plays on, and tries its way about the world with playful paw and nose, long after its size and age might lead us to expect a sober maturity. Those animals nearest of all to ourselves, the monkey and the ape, are like us in keeping the will to play even into maturity ; but no animal young play so freely, so inventively, so continually and so long as human children." "All this would suggest that play means much as a way of development for the learning animal : and those who have watched the play of children have long looked upon it as nature's means of individual education." ¹

What the child acquires in play is primarily a control free from the limitations of an unyielding reality. And, incidentally as it were to the child, though integrally in the scheme of natural education, he acquires forms of bodily skill, elastic patterns of interpretation, habits of promptness and unselfishness, and the germ of future sentiments for enterprise and co-operation. He plays at different games at different ages. At first his play is essentially individual, although he prefers an audience to admire and models to imitate. In his joy in repetition of a feat accomplished we may see with Freud an example of the power motive. The child asserts, as it were, the prowess of one thing done correctly several times against the devastating number of the things he cannot as yet achieve. He is at first relatively independent of exact material, but he comes in time

¹ *The Nursery Years*, page 8.

to appreciate those 'toys' by which he can work from his partial knowledge to greater understanding and constructive effort. Mrs Isaacs divides play-things into four categories which she calls respectively, (1) things that help physical growth, (2) material for making things, (3) fantasy material, and (4) formal material. A visit to a nursery school will furnish ample illustration of the nature and use of such material. Formal material is familiar under the guise of Montessori apparatus, and has been discussed to some extent in connection with sense-perception. Fantasy material includes toys which are more or less complete replicas of the tools of adult life. By their aid the child can enjoy for a time the privileges of the adult in his various capacities and indulge what Sir Percy Nunn refers to as his "experimental selves". We have alluded in a previous chapter to that aspect of imagination which is labelled phantasy and which consists in effect of an escape from unpalatable realities. We have discussed the possible dangers of make-believe, and have agreed that while excessive make-believe may hinder progressive control of reality, its employment in moderation is a palliative and may even prove to be a valuable incentive to consistent effort. We need not grudge to the child the temporary power which he acquires in play, though we may take pains to ensure that he is not handicapped by material in the constructive play which brings more exact knowledge and more readily applicable skill.

Co-operation in Play.—Co-operative play, in which connection this discussion has arisen, comes comparatively late in the child's life. But, as Mr Bertrand

Russell reminds us, "Collective play, as soon as it becomes possible, is so much more delightful that pleasure in playing alone quickly ceases"¹. There are some forms of games which consist essentially in measuring one's own degree of skill against that of an opponent. We are back again at the subject of competition, which would seem an inevitable accompaniment of the group wherever organized. We need not however take too seriously the competition involved in games between individuals. The opponent is primarily a useful measuring rod against which one estimates one's own achievements and the pride of victory gives place to a desire to merit a more formidable opponent. Team games are a different matter. Skill and health are acquired and co-operation is essential, and victory and defeat are about equal. The phrase 'playing the game' has come to stand for a definite ideal. Realized on the playing fields it is hoped that it will be carried over into other fields of activity.

Play and Work.—Under the heading of co-operative play we must also take into account the spontaneous games of childhood which are in the nature of ambitious enterprise demanding individual contributions to the common purpose. Hunting games, the building of secret dens, the production of a play or magazine, the invention of a secret language, are forms of play in which the intellectual element is prominent. The child learns readily in this connection forms of skill, and consents to a measure of drudgery which he would find irksome under the conditions of the class-room.

¹ *Education*, page 104.

The educator has been quick to grasp the significance of these forms of play which approach so nearly to methods of work. He has taken over their methods into the class-room and has tried to give to lessons the spontaneous joy of constructive play. It is not easy to define exactly the difference between play and work. We find in the dictionary that play is "exercise for amusement" while work is "effort directed towards an end". But we can point to the very definite end of forms of co-operative play, and to drudgery undertaken and fatigue sustained in a degree incompatible with mere amusement. We can on the other hand find instances of work which is undertaken voluntarily from interest, and which brings greater pleasure than any form of mere 'amusement'. If we consider those forms of activity which give us most permanent satisfaction we find that they contain elements of both play and work, that they have often begun as work but are continued as play. But we should agree that no activity can be called play unless it is spontaneous and comparatively free from external constraint.

Play Methods in the Class-Room.—The aim of the teacher is to bring together as far as possible the fields of play and of work. He believes that by so doing he will preserve the joy of spontaneity, and at the same time further the acquisition of desired forms of learning or of skill. In this belief he has the support of the great educators, both past and present, who have seen in this reconciliation of play and work the most effective medium of instruction. What is called the Play Way in Education may be applied to most of the subjects of the school curriculum,

since its requirements are spontaneous effort and initiative in construction or discovery. There is much in common between modern methods of teaching Geography and the Boy Scout movement. The Project Method, which is now so much in favour in experimental schools, relies upon the stimulus of spontaneous curiosity in the chosen environment for the unfolding of the school course. With the large numbers in the schools of the national system of education it is not easy to follow the principle so closely. But the manifestations of common curiosity are so varied and so universal that they form convenient starting-points for many of the branches of Mathematics and Science. In the interests of a practical task children learn readily the bookwork which will furnish the necessary power for its completion. Mensuration in Arithmetic and the home district in Geography, are perhaps the most ready illustrations.

Dramatization is a feature of the history lessons given in the elementary schools, and meets with a ready response. It is a simple expedient taken over from the play of children, and provides an outlet for individual expression circumscribed by the setting required. It is in connection with such simple efforts that imaginative activity finds its firmest basis. We discussed in a previous chapter the necessity for providing suitable material upon which imaginative constructive work can be developed. In this connection the play way is perhaps the safest guide.

Sir Percy Nunn has shown how the connection between play and forms of art may be applied in school. Progressive mastery of material in respect

of its possible manipulation leaves leisure for experimental handling issuing in decorative design. The child in school may be compared to the craftsman of old whose first concern was to make an article adapted to a useful purpose. Conceptions of beauty and skill in artistic creation are derivations of this first understanding of material. "Let boys and girls make under conditions that stimulate the natural flow of energy, let their social milieu be free and humane; let them acquire by pleasant repetition the mastery that enables them to play with their materials and beauty will inevitably appear, though in varied measure in the things they create."¹

Rhythm.—There is one further element observable in play which appears to be allied to a fundamental characteristic of pleasurable experience. This is what we understand by rhythm. We do not read of a rhythmic instinct but in the movements of deer, the heaving or hammering of the negro at work, in dancing and all forms of skilled movement, in music and in plastic art, we can trace the influence of rhythm subserving ease and beauty. The apparently unconscious introduction of rhythm into personal idiosyncrasies of movement or into our own efforts of learning may be taken to indicate the need experienced. Within the school the most obvious expression of rhythm is seen in dancing and in music. The apprehension of the rhythm of a melody is considered an essential part of musical instruction. A broader reflection of the same principle may be seen in the cycle of routine, in alternating activity and passivity, in self-assertion or submission. It is well for the teacher to understand something of the working of

¹ *Education, its Data and First Principles*, page 80.

this great principle, and to allow for its rational expression. He may also help to produce a more conscious awareness of its workings in respect of appreciation of beauty in its several spheres.

Curiosity, Construction and Acquisitiveness.—We have alluded frequently in the foregoing pages to curiosity and constructiveness as important factors in the educative process. They are in fact fundamental and make their appearance at a very early age. By many psychologists they are included under the heading of instinctive activities and to them is added another, acquisitiveness, which has a definite bearing upon the problems of education. The question of the number and grouping of primitive instincts is an extremely controversial one, and modern psychology is divided in its theories. We have therefore avoided in this book the acceptance of any one classification. (The main outline of the instinct controversy is given in the appendix), and the student interested in psychology will find the following up of the different lines of approach an absorbing pursuit. For the teacher in the class-room it is necessary that he should know what forms of activities make their appearance early in life and have a strong influence over later behaviour. To them he will look for the main incentives of learning and the paramount source of interest. Among such activities must undoubtedly be included curiosity, construction and acquisitiveness. While they may not seem to have a close connection with the problems of group life which have formed the contents of this chapter; they are in reality constituents of all forms of activities, and a brief discussion of each in turn may serve to round

off our treatment of common elements of character.

Curiosity may be traced back to the infant's first fixation of moving or bright objects, construction to his random exploration with his hands, and his apparent satisfaction in handling whatever is within his reach. Mothers are quick to interpret expressions of wonder and surprise, in quite young babies, and to note an expression of satisfaction or pride in successful manipulation. The development of language and increase of manipulative control bring a correspondingly increased expression of curiosity and constructiveness. From the age of two and a half the child asks many questions on a great range of subjects, while what often appears to be wanton destruction of property is undertaken in the service of mingled curiosity and construction. The answers to the questions will open up many fields of learning. It is an important maxim that answers to children's questions may of necessity be partial, but that they should always be truthful even in relation to sex matters, a frequent source of questioning in young children. Modern toys are so designed that they yield easily to the child's curious dissection and afford opportunities for later reconstruction. Mrs Isaacs brings forward a plea for wider opportunities for care of living animals and dissection of dead ones by children as a valuable source of knowledge, and as an antidote to ignorant cruelty. It is not necessary to say much more on these two subjects. In the urgent need to understand his environment is to be found the chief stimulus to learning. The more closely school-work can approximate to fields of childish curiosity the more successfully will the

learning be assimilated ; and the more opportunity it provides for constructive handling of material the less likelihood will there be of futile destruction of property as an outlet for unsatisfied energy.

Acquisitiveness.—This form of activity would appear to be essentially individual and therefore hostile to the common good. Traced back by some writers to the grasping reflex of the young baby, it has little biological importance, since hoarding does not form an integral part of human activity. In so far as we identify ourselves with possessions they contribute to our self-esteem and give us a certain superiority over others who have collected less of this or that commodity, and in so far as the object of our collection has aesthetic or utilitarian value we acquire much knowledge in its pursuit. Since, then, the activity of collecting is in itself pleasurable the task of the teacher is to see that the objects collected have a specific and so far as possible a common purpose. Children respond readily to requests for specimens, or newspaper cuttings, and their offerings form important additions to the school museum or collection of illustrative material in history or geography. While the ideal is to cultivate a sentiment for common rather than for individual property, it is equally true that a child deprived of a reasonable amount of private property finds it difficult to acquire the respect for public property which is no less essential in the running of a school library than in the maintenance of public order in civil life.

There are so many tools available for the teacher's use both in respect of the spontaneous activity of the child, and of the controlled situations of the

school environment, that education should apparently be an easier process than it is. "A proper education", says Mr Bertrand Russell, "would make it possible to live in accordance with instinct, but it would be a trained and cultivated instinct, not the crude unformed impulse which is all that nature provides. The great cultivator of instinct is skill: skill which provides certain kinds of satisfaction but not others. Give a man the right kinds of skill, and he will be virtuous, give him the wrong kinds or none at all and he will be wicked."¹

To this we can give ready assent. But just as in the case of the learning process we find marked differences both in respect of general and specific abilities, so in the sphere of emotional life we find marked individual differences which may upset the most carefully planned schemes of common educational treatment. To the consideration of some of these differences we must now turn.

REFERENCES

- NUNN. *Education, its Data and First Principles*, Chapters VI-XII, XV.
 RUSSELL. *Education*, Chapters V, VI, VII, X.
 ISAACS. *The Nursery Years*, Chapters IV-V, VI.
 THOMSON. *Instinct, Intelligence and Character*, Chapter IV.
 WOODWORTH. *Psychology*, Chapters VIII, XIX.

¹ *Education*, p. 105.

CHAPTER XVII

INDIVIDUAL DIFFERENCES IN EMOTIONAL EQUIPMENT

Concept of Personality.—Character is admittedly acquired, although its foundation must be considered as laid in the structure and constitution which the individual inherits at birth. It is defined by Woodworth as “ the sum total of a man’s native and acquired tendencies to reaction with emphasis on those reactions that affect his life and social relations in a broad way ”.¹ In its estimation motives are considered of equal importance with overt behaviour. Such motives are essentially acquired and follow the lines of organization of sentiments indicated in a previous chapter. They are compounded of experience in which emotion and action are interwoven. The chance or deliberate admixture of these in early childhood tends to weight further development somewhat disproportionately. By the time the child comes into the teacher’s care he has already acquired a definite personality of his own. The term personality is a convenient one in which to include those elusive factors which mark out one individual from another. It expresses a central core which, like the factor of general intelligence, makes its influence felt in widely differing reactions. The individual may drop off and add on sets of sentiments, may modify his impulsive behaviour in this

¹ *Psychology*, page 529.

or that respect, but the residuum which is peculiar to his personality remains constant. Sometimes we find people who appear, as we say, to be two different people, who according to the circumstances of the moment show widely different aspects of themselves. In acute pathological cases we hear of what is called dual personality in which the dissociation of one aspect from another appears to be complete. We measure the integration of character largely by the comparative uniformity of the front which the individual presents to the world around. We deplore fickleness but we welcome adaptability, we are irritated by the unduly placid, but we value the reliable individual. This implies a distinction, obscure but real, in our valuation of central emotional concomitants and the variations exacted by changing circumstances.

The basis of individual differences.—There are two terms associated in psychological literature with those aspects of personality which we have lightly sketched. They are "temperament" and "disposition". In common speech they have an individual colouring. The teacher speaks of a child as of a sullen or cheerful disposition, of a sanguine or morbid temperament. Both terms imply something given which in its nature or degree assists or hinders the child's adaptation to the circumstances of his environment. The psychological definition of "disposition" is according to McDougall 'the sum total of a man's instinctive tendencies', and in this sense it has a meaningful interpretation. It would appear to be true that differences in structure at birth give rise to different degrees of disturbance caused by fear, anger, or love and even of differing amounts of curiosity or acquisitiveness.

It is very difficult to determine the extent to which such differences are really innate or the product of early environment, but from the point of view of the teacher or educator this controversial point is comparatively unimportant except in one respect. Whatever may be the nature of innate differences in emotional equipment the early environment is of at least equal importance: This point has been emphasized so often in the foregoing pages that it is only necessary to make passing allusion to the contribution of nurses, and teachers in nursery schools, to the development of future disposition. It remains true that by the time the child enters the infants' school these differences are well marked and entitle the teacher to speak with conviction of the varying dispositions within his class. The teacher feels that such individual differences are largely responsible for the serious breaches of discipline which from time to time occur. We have so far discussed disciplinary problems mainly in the light of common ground of equipment. We have now to take into account the nature of the effect of individual differences in this respect.

General Emotionality.—Just as modern methods of instruction have learnt much from the study and treatment of the mentally defective so, in the sphere of character and discipline, much can be learnt from the study of children whose conduct is refractory to such an extent as to bring them to the notice of the children's courts, or to the investigation of the trained psychologist for purposes of treatment. In Professor Burt's book, *The Young Delinquent*, we find set out the main types of causes of such breakdowns. He

finds that delinquency is associated in general with over-emphasis of some instinctive form of activity combined with unsatisfactory opportunity for its assertion. He also found that "excessive liability to one particular instinct tends (at all events, as a general rule though not necessarily in any single individual) to be accompanied by a liability more or less excessive to most of the remainder"¹. He has been led to postulate the existence of a central factor of general emotionality, comparable to the factor of general intelligence, which shows its influence in all forms of activity. He has recognized that what is important for the harmonious functioning of experience is not so much the actual amounts of intelligence or emotionality as their relative strength. The ratio of intelligence to emotionality he defines as the measure of stability.

Temperament.—The term "stability" suggests an attribute universally agreed upon as desirable. As variants of the unstable, the teacher recognizes moodiness, unreliability, undue exaggeration of enthusiasm and lethargy, of high spirits and depression. It is in connection with such alternatives that the term temperament is in common speech applied. Unattached to any specific emotion, it is rather held to be a form of manifestation of each or all. Temperament has occupied the attention of physicians, philosophers and psychologists for over two thousand years. The ancient classification given by Galen still retains its place in literature and common speech, although the physiological basis upon which it was supposed to rest has long been discounted. This classification was

¹ *The Young Delinquent*, page 506.

sanguine, choleric, phlegmatic and melancholic. To these was added later a fifth, the nervous, and in comparatively recent times the cautious. The first four of these terms carry their own significance. The teacher frequently alludes to children in his class as volatile, hasty, lethargic or depressed, but the old-established terms would serve him just as well. He does not consider any one of them as itself sufficient indication of instability, but he regards the choleric as inclined to be unstable, the sanguine as facile and unreliable, the phlegmatic as unresponsive, and the melancholic as perhaps the most seriously disturbed as well as the most rare. To none of the four would he give to-day a positive laudatory colouring. From the disciplinary point of view the phlegmatic gives least trouble, but also least satisfaction in instruction, the sanguine raises hopes only to dash them in the face of difficulties, while the choleric is a possible source of trouble in discipline, but likely to put forth consistent effort in the service of interesting activity.

Possible Physiological Basis.—To what are such differences due? The old basis was that of the humours of the blood themselves based upon the combination, two and two, of the four qualities—warm, cold, moist and dry—of the four elements, fire, earth, water, and air. Blood composed of the warm and moist produced in excess the sanguine temperament; phlegm the combination of cold and moist, bile of hot and dry, and black bile of cold and dry, gave rise in like conditions to the phlegmatic, choleric or melancholic temperament. With the progress of the sciences of physiology and medicine the humours gave place to nerve-substance, and the most modern counterpart

of the theory is to be found in the theories of the effect of the endocrine glands. We alluded in an early chapter to the function of the ductless glands as reacting organs, and to their probably close connection with the sympathetic nervous system. So little is definitely known about the nature of these interactions that any generalization would be premature. Experimental evidence points to an increased output of adrenin in rage reactions, to a connection between the pituitary glands and the development of sexual maturity, and to active connection of over or under activity of the thyroid gland with excitability or under-developed intelligence respectively. Upon this slender basis enthusiasts have built up sketches of types of endocrine personalities determined by the preponderance of a particular form of glandular activity and comparable in some respects to the old classification of temperament. While we must regard such attempts as premature and untrustworthy we shall do well to follow with interest the progress of research into the precise functioning of the endocrine glands. The available evidence points to an alliance with the sympathetic nervous system of the thyroid and suprarenal groups and to a consequent influence upon the rate of metabolism and growth. We have seen that the stimulation of the sympathetic nervous system is most active in emotional states, and it may be that upon its harmonious functioning with the endocrine gland system, depends to some extent the degree of emotional disturbance caused by a relatively light stimulus. The examination of an "over excitable" or "unbalanced" child by the doctor or psychologist takes into account the functioning

of the ductless glands. The teacher may expect to find within his class individuals who differ in the speed with which they can react to a change of topic or of type of instruction, in the time required to recover from temporary disturbance, or in the speed with which they make a choice in apparently equal conditions. Such differences may in effect be individual characters and should receive consideration as such.

The Cautious Temperament and the Concept of Will.—

We alluded above to the addition of a 'cautious' and a 'nervous' temperament to the classical list of four. The researches of Ach with whom the term 'cautious' originated were conducted on the basis of certain characteristics which are clearly relevant to the teacher's task of understanding and allowing for individual differences. They included initial speed of decision, and maintenance of the initial speed in face of difficulties. The cautious temperament was in the view of Ach best reserved for that individual organization which maintained at a high level the initial speed of attack. It is, he considered, the most satisfactory human temperament from the point of view of overcoming difficulties and contributes to what is called a strong will. His whole investigation was on acts of will, and the two characters we have mentioned are recognized constituents of willed action. But while there may be innate differences responsible for speed and maintenance of reaction, it would be a mistake to suppose that such differences alone will account for the distinction between the strong and weak-willed individuals. In a discussion of character and personality it is inevitable that the concept of

will shall be introduced. Much has been written upon it and upon the possible classification of 'types of will'. For our purpose it will suffice to emphasize the point that in the last resort the strong and weak will are essentially acquired and based upon the opportunities for satisfactory self-assertion provided in life, upon the judicious graduation of difficulties in tasks to be undertaken, and upon the value and elasticity of the sentiments formed. The words of Sir Percy Nunn sum up the position as the teacher requires to envisage it.

"From this account it should be clear that there can be no 'training of the will' apart from the general process by which the sentiments are built up. Hence, Dr Montessori is right in maintaining that to train a child's will we must begin by leaving him free to work out his own impulses. For if he is constantly checked or constantly acts only on the directions of another, there can be no building up of strong sentiments to be the basis of effective and well-regulated conduct."¹

The 'Nervous Temperament.'—Modern research is directed to the exploration of the 'nervous temperament' with the object of discovering not only its underlying basis but of detecting in advance predisposing causes towards the more serious disturbances which are classed as neuroses. The conditions of modern civilized society and its increasing specialization make increasing demands upon the nervous energy of its constituent individuals. To meet this demand it is increasingly necessary that the individual shall present to the world a tempered courage in the face of reality, and that he shall achieve an inner stability. This is

¹ *Education, its Data and First Principles*, page 174.

only possible if his emotional life has been organized upon a satisfactory basis. We are familiar with displays of groundless anxiety, of irrational fears, and of lack of concentration or over concentration in our 'normal' acquaintances. It is such disabilities which modern research is tackling. The term 'nervous temperament' is used in this connection in a different sense from that of a possible single innate character which we have previously employed. In this setting it obviously denotes a complex character, compounded of many elements innate and acquired. Its investigation takes us back along the lines we have followed in discussing the organization of interests, sentiments and complexes. But the characters included within the scope of the term 'nervous temperament' in its modern connotation are such as are recognized as of serious import and of common occurrence in present day conditions. Their elucidation and diagnosis at an early stage is clearly an urgent problem.

The roots of serious offences in children.—The more serious disorders of the class-room reflect in some degree the characters of juvenile delinquencies. We have quoted Professor Burt's conclusion that these spring always from excessive or non-socialized expression of the fundamental forms of activity which are called instinctive. Side by side with such equipment are found complexes of the authority or inferiority type. We may quote some of the circumstances which he found to be typical of the delinquencies which find the most common parallels within the walls of the school. Special attention is called to those offences which are in the nature of substitute responses. That is to say the thwarting of some particular activity

leads to some compensating action which, itself reprehensible, secures to the offender the attention or self-assertion he has otherwise failed to secure. Thus, stealing, a common occurrence in most educational institutions, may often be traced not so much to uncontrolled acquisitiveness as to thwarted affection, or to an inferiority complex which leads to this method of spurious self-aggrandisement. 'Any emotion', says Professor Burt, 'once set going, if it have no object or have lost its object, tends always to find for itself some object of its own, to get as it were some workable point of application, some channel through which it may discharge. Now acquisition, like anger, is essentially an instinct for coping with an obstacle; it is nature's device for procuring what one needs but need not possess. Thus, like anger, it readily appears as secondary to some other desire. Once, however, it is launched fully with its own momentum this covetous craving behaves like other moods and humours—like grief, ill temper or anxious apprehension: it is liable to break loose from its real root or origin; and like a floating weed to fasten itself parasitically upon almost any concrete substitute, however irrelevant, however illogical, that may chance to offer it some palpable hold.'¹

Anger.—In respect of anger, the most common manifestation within the school is in the form of outbursts of temper and teasing attacks on other children in the lower part of the school, sullenness and obstinacy in the upper. Either form of display is disastrous to the harmonious working of the class, and as the teacher is well aware leads to general

¹ *The Young Delinquent*, page 451.

disintegration. To prevent its occurrence is obviously the best expedient, but its eradication is a slow process. It depends upon so many factors. Thwarted self-assertion at home in early childhood, or undue deprivation of affection or property, is not cured immediately by the appointment to some minor post of responsibility. But every little helps, and the teacher who understands to some extent the underlying causes has great influence in securing to the child those profitable avenues of constructive experience which are the safest means of preventing angry display. The suggestion exercised by a busy and happy classroom atmosphere is a more powerful deterrent than rebuke which conveys a sense of guilt and a reinforced feeling of wilful thwarting. The teacher who knows the over-excitables in his class will guard against undue fatigue or stimulation. We spoke in an earlier chapter of the desirable personality in a teacher as at once stimulating and soothing. We may perhaps express this more satisfactorily by saying that the teacher must know when to be a stimulant to active interest and when to be a sedative to jagged nerves.

Self-Assertion and Submission.—Displays of anger cannot be considered apart from the general manifestations of self-assertion. The teacher is confronted by two opposing types showing excessive or too feeble self-assertion. Each is probably related as much to early environment as to innate endowment. What is called contra-suggestibility in which the individual takes apparent delight in doing the opposite of what is desired or suggested, must be looked upon as derived from thwarted opportunities of reasonable self-assertion. The contra suggestible child has acquired a

self-regarding sentiment in which suspicion and fear play a large part. These can only be removed by the gradual evolution of trust and sympathy which will in turn be fostered by attitude and behaviour rather than by open rebuke or reasoning. Humour but not bitterness should be a feature of the casual rebukes which the teacher feels called upon to administer. We spoke in a previous chapter of the 'authority and inferiority complexes' which may be found in children of school age; and we sketched the lines along which they will in all probability develop. Of possible manifestations, uncalled for self-assertion and undue submission are both frequent. Of these the latter gives less cause for open disciplinary trouble, but the teacher concerned for the welfare of the individual deplures it perhaps more than undue assertiveness, since it is clearly a serious barrier to individual up-standing in the face of the problems of life. The too submissive child may also be so easily led by the more assertive members of the class that he finds himself an unwilling party to their misdemeanours without deriving any satisfaction from their perpetration.

Lying.—Fear is a recognized ingredient in the presence of over-submissiveness, and is also held to be one, though by no means the only one, of the causes of lying. Much has been written on the subject of childish lying, and it is to the general effect that lies should not be considered as the manifestation of deeply entrenched wickedness, and that discrimination must be exercised in respect of the type of lie and the probable causes which provoked it. It is only in lies of excuse for a fault that fear plays the leading part, and lying on such occasions is the obvious

corollary of conditions which have led to lack of confidence and fear of punishment. In such cases to punish further for the telling of the lie will only add to the accumulation of fear and distrust and to greater precautions over the subterfuge adopted. Many of the lies of children are the natural outcome of imaginative activity let loose and of a hazy distinction between fact and fiction. Where they result from real confusion the child is only too glad to have the real facts explained, while in respect of flights of imagination undertaken for the joy of the activity education can provide many interesting avenues for its expression which will take the place of the old fictions. Some lies, on the other hand, are the expression of thwarted wishes, and should meet with the sympathetic reception which their perpetrator demands.

Sex Offences.—In all schools the teacher is from time to time faced with offences classed together under the heading of sex. Though they may come rarely to the notice of the teacher, they will probably be present in greater degree. We have already alluded to them, but may repeat here the nature of their cause—unsatisfied curiosity in respect of sex matters and undue repression in childhood of interest in regard to them. They are difficult for the teacher to handle, especially when the parents do not collaborate with him. It is at least necessary that the teacher's own attitude in respect of this class of offence shall be an enlightened one, and that he shall recognize the increased urgency of emotional drives which comes with adolescence. For the rest his hope is largely in active interests and acquired sentiments, but these must be designed not to cover up and repress further, but .

to assist in the working out of a sex instinct which is understood.

The following quotations from Professor Burt's book, *The Young Delinquent*, will summarize the main arguments of the foregoing chapters. 'It follows from this view that one easy way of deflecting tendencies to crime is to provide at an early age less harmful outlets for these crude instinctive ebullitions. The diversion of emotional energy from the lower forms of instinctive behaviour into higher interests that shall be at once legitimate and beneficial to society is sometimes called 'sublimation'—a useful term for a useful principle.'¹

"Idleness is the one thing that it is essential to avoid. Emotional children must be kept sedulously busy. The chief enemy of virtue is not vice but laziness. Mechanical drudgery at abstract tasks or hated home-work is not real activity to the volatile delinquent. If no interest is kindled, no enthusiasm stirred, the mind closes its eyes and droops back into a sensuous dreaming. . . . Room must be found in the child's life for cultivating each natural proclivity by hard but congenial work."²

Emphasis has been laid chiefly upon those individual differences in emotional equipment which are most likely to lead to serious disturbance in the classroom and in life outside. This was inevitable, but in concluding this short review of individual differences we must remind ourselves that they are to be found in their degree in the personality of each child within the class. They are the source not only of difficulty

¹ *The Young Delinquent*, page 495.

² *Ibid*, page 505.

but of valuable individual contribution. The teacher who understands and appreciates such differences will not only be guarded against trouble, but will add new interest to his educational work. He is strongly advised to make himself familiar with the individual home circumstances, interests, 'temperament' and 'disposition' of the children in his care. In the light of this knowledge he will be able to appreciate differences perhaps unsuspected and to replace former irritation by interest in differences which are understood.

REFERENCES

- BURT. *The Young Delinquent*. Special reference to Chapters VII-XII.
 CHADWICK. *Difficulties in Child Development*, Chapters V-IX.
 BLOOR. *Temperament*, Chapters III-IV, IX, and Appendix.
 DOWNEY. *The Will Temperament and its Testing*.
 THOMSON. *Instinct, Intelligence and Character*, Chapter XXII.

CHAPTER XVIII

AIMS AND ORGANIZATION

Introduction.—In the Suggestions to Teachers issued by the Board of Education we find the view expressed that whereas there was formerly a recognizable distinction between the aims and standards of the public school, the secondary school, and the elementary school—the first training for governing, the second for hard work and efficiency and the third for docility and submission—the present trend of progress is towards the same standards in all. That this should be so in respect of moral standards is clearly desirable; in respect of curriculum and procedure there must of necessity be marked differences in the types of educational institutions within the national system. Our next task is the investigation of the principles which will dictate these differences. The most superficial study of the existing educational system in England shows up the anomalies which have arisen in its evolution. Compulsory education is a comparatively recent development and the schools originally designed to meet this demand envisaged a very limited aim. During the last fifty years we have seen a tremendous expansion of the original aim, and this expansion is reflected both in the age limits of compulsory education and also in the scope of the education provided.

The present day may be regarded as a nodal point in the developing system. We are confronted with demands and schemes for the extension of school age at both ends, and for the revision of existing lines of demarcation within the system.

It is not necessary to say much in this book about the demand for extended provision of nursery schools. The requirements of the young child are well to the front, and the lines of discussion in the previous chapters should be sufficient indication of the vital necessity for careful supervision of environment in the early years. As to whether this environment is best provided by the state or by the child's own parents is a matter of dispute in respect of the children of well-to-do parents. But where the home is poor and both parents out at work there can be no doubt of the value of and necessity for the provision of suitable 'children's homes' or 'nursery schools' by an enlightened public seeking the welfare of its future citizens. We know that Dr Montessori's educational experiments were conducted in a 'children's home' attached to a large tenement house, and we have seen the valuable incorporation of many of her methods into the 'baby-room' of the infants' school. In many towns the 'baby-room' is the only approach to a nursery school provided. But those who have seen a good nursery school in running must realize that it does far more for its members than the best regulated 'baby-room'. It becomes literally the controlled environment within which childish habits are formed, individual development is cared for, and the demands of the group unostentatiously met. The child who begins his school career in such a milieu is well equipped

against the disasters of conflict such as we have instanced in the previous chapter. It is then not surprising that many people should feel with Mr Bertrand Russell that "even in the case of parents who are highly educated, conscientious and not too busy, the children cannot get at home as much of what they need as in a nursery school."¹ "The nursery school occupies an intermediate position between early training of character and subsequent giving of instruction. It carries on both at once and each by the help of the other with instruction gradually taking a larger share as the child grows older."²

The nursery school presents its own problems in respect of organization. Its function embraces the physical, mental and moral development of the child in his most formative years. If the development of the nursery school in this country has been slow, we may yet be grateful that it has been in the hands of enlightened pioneers who have been alive to its responsibilities and aims.

The Elementary School.—On emerging from the nursery or from the nursery school the child, whatever the social status of his parents, must be educated by some specific agency. For the majority this agency is the school, either the preparatory school for fee paying pupils or the public elementary school. In England the distinction is well marked. In newer countries it is almost non-existent. The distinction is, moreover, not only one of fees, but extends to the function of the school. The preparatory school is definitely a stepping-stone to higher education. The

¹ *Education*, page 179.

² *Ibid.*, page 153.

elementary school was originally devised to provide a complete scheme of limited instruction. The progressive development of the national system of education has secured not only that the public elementary school shall be for some at least of its pupils preparatory to further education in another type of school, but that for all of its pupils it shall embrace those avenues of approach to knowledge which provide the basis for interested and intelligent activity. It has sought to secure that even those children who 'leave school' at the age of fourteen shall be equipped with the background of knowledge and interest against which the activity of a wage-earning existence shall acquire a new significance and the intervals of leisure added possibilities. We cannot enter here into the gradual expansion of the curriculum of the elementary school nor into the obvious justification for the inclusion of the various subjects within its scope. The lines of development of the learning process and of individual character which have formed the content of the preceding chapters should bring their own contribution to problems of this nature. Nor can we enter into a discussion of the possibilities, which an age-limit of fourteen allowed for the realization of the avowed aims. We can point to the progressive raising of the leaving-age and to the present proposed readjustments in that respect. But in this connection we touch the most important present development of public policy in respect of national education. It is realised that the extension of the leaving-age involves also the responsibility for finding suitable types of schools. 'The Education of the Adolescent', a report issued by the Consultative Committee of the Board of Education,

marks a fundamental advance in the whole conception of the function of educational institutions. The nature of the advance is briefly this—the recognition of the fact that the type of school for any child should be related to the needs of the children who compose it and that these needs are not primarily a function of the social status or future vocation of the individual but of the recognized requirements of his age.

Seven to Eleven.—Such characteristics are grouped together under the heading of psychological, and their consideration has led to the important conclusion that for all children a break should be made in existing educational methods at the age of eleven. We will discuss shortly the factors which have contributed to this result. For the moment we may consider briefly the position of the child between the ages of seven and eleven. He is at the stage of primary education. By the name 'primary' it is proposed to designate schools of the elementary and the preparatory types. "This", says Professor Nunn in reference to this age interval, "should be for all children the period of primary education, that is a common scheme of instruction and training that meets the intellectual and moral needs of childhood and supplies the indispensable basis for the education of youth."¹ The intellectual and moral needs of childhood have formed to some extent the theme of this book. With the knowledge of their underlying principles the teacher is armed to interpret the curriculum to the best of his individual ability, and while he must perforce make many mistakes and

¹ *Education, its Data and First Principles*, page 206.

radically revise his procedure he will be the less likely to 'sin against the light'.

In many respects this period is one of the most straightforward from the teacher's point of view. The child is relatively 'mature' and has not yet been thrown into the second confusion of adolescence. If the early environment has been satisfactory emotional conflicts will be comparatively rare. For the majority of children the chief business of life is doing actively those things which lead to understanding and control of environment. Between the ages of seven and eleven are initiated those "forms of skill which lead a man to employ his instincts usefully". The teacher's prime concern is to supply the situations which the child requires and to see to it that instruction and method are graded to meet individual ability and speed of working.

Psychological features of Adolescence.—It must at first sight seem strange that 'the education of the adolescent' should be considered as beginning at the early age of eleven. We are accustomed to consider adolescence as coinciding with the onset of puberty some two or three years later. The achievement of sexual maturity brings with it an accompanying increase of emotional expression which carries its influence into all forms of activity. The early teens are recognized as requiring special care from parents and teachers. All that has been said on the sublimation of given instinctive activities applies in still greater strength to the sexual emotion of the adolescent boy or girl. The conditions of modern civilization make it desirable in the interests of future careers and fuller individual development to delay the natural

outlet of the sex instinct, but they cannot at the same time delay the emotional disturbance which goes with it. This disturbance affects, as we have said, all fields of activity. The educator is urged to utilize sex-emotion in the interests of aesthetic appreciation and artistic creation, and to provide such opportunities for outdoor exercise as may mitigate the disturbances caused by it.

We are familiar with certain aspects of behaviour in the adolescent boy or girl, day-dreaming, moodiness, uncouthness, sudden great enthusiasms and experimental testing of one hope of stability and enlightenment after another. But all these aspects we associate with the years thirteen to sixteen rather than eleven to thirteen. We link them on to definite physiological changes which do not generally show themselves before the latter age. But there is evidence to show that before the physiological change occurs definite changes in 'mental organization' are already well established. The teacher is aware of certain difficulties centring round the age of eleven, which indicate to him that childhood is being left behind. Disciplinary difficulties may become more acute, and it is at about the age of eleven that the enjoyment of group-activity in its many forms becomes apparent. While this is a desirable stage in the evolution of the group sentiments to which we have already alluded, it also carries with it the love of secret societies and factional agitation. But it is on the intellectual side that advance is most marked at this age. The bright child of eleven is the joy of the teacher's heart. Apparently free from the foreshadowing of the emotional disturbance of adolescence, he shows evidence

of rapidly developing interests. Most significant for educational purposes are the growing interest in general principles as opposed to isolated situations, the development of reasoning activity in respect of symbols, and increasing pleasure and power in creative work. Special aptitudes begin to develop and the child envisages his work in a new light.

There is a familiar division of pre-adult life into four 'waves of development', infancy, childhood, pre-adolescence and full adolescence. A parallel is often drawn between the helpless instability of infancy and early adolescence, and between the comparatively firm establishment of childhood and full adolescence. The young adolescent is, like the infant, swamped by the stimuli of new situations, flooding the area of his previously acquired stability. It is best then to take him between the ages of eleven and twelve, at the time of his intellectual advance and before he is overwhelmed by emotional excitement and to provide him with a new background against which he may progress to the firmer stability of maturity. Such in brief are the 'psychological' arguments in favour of the proposed change of school at eleven.

Change of School at eleven.—Another argument in favour of the change for all at this age is the disappointment experienced by the children in the elementary school when their more successful contemporaries are drafted into the secondary or central school. By their relative failure in a competitive examination they are marked out as to some extent inferior, and are wont to consider the remainder of their school life as a mere marking time until the real business of life is begun. The care bestowed upon the children

in the upper part of the elementary school, and the enlightened measures adopted to secure that the last years shall open up profitable avenues of experience, do much to minimise these dangers. But it would appear to be a more effective device to re-organize existing institutions so that all education after the age of eleven is definitely labelled as post-primary.

Certain practical objections against the arbitrary selection of the age of eleven as a dividing line may be noticed. It is argued for example that a cut through the school at the age of eleven would involve children of at least four different grades of instruction or standards, and that such children are quite obviously at very different stages of attainment and have consequently different qualifications for entering upon a post-primary course. It is suggested that the mental age of eleven would be a more satisfactory point of division, but in reply to this it is urged that such a criterion would effectively debar the less intelligent children from ever leaving the elementary school. The varying attainments of children of eleven, though an undoubted fact, would hardly be a sufficient argument against the proposed change. The new system designs that all children shall proceed at eleven to a new school, but not that all shall go to the same type of school. The types are designed to meet the degree of intelligence and special aptitudes of children, and within the compass of each type it is possible to secure a classification on the basis of mental rather than chronological age.

Suggested Types of Schools for Post-Primary Education.—Among the proposed types may be mentioned grammar schools, central schools, junior technical

schools, trade schools, and senior departments. Of these grammar schools will approximate to the present secondary schools, while in the other types there will be a practical bias of greater or less degree. In no case, however, is the post-primary school to be considered as a mere training ground for some specific vocation. The report emphasizes that in all types the needs and interests of the young adolescent shall be the primary consideration in the drawing up of a curriculum which shall be ' humane but not bookish ' practical but not purely technical. We may find in this statement of aim a fresh stimulus to the consideration of the problem of what constitutes a truly liberal education. The underlying argument is that almost any approach can be the foundation of a liberal education, provided that it be broad enough and that its points of contact with wider interests are seized upon and emphasized. For the first two years the education in post-primary schools is to be general, embracing the well-established subjects of the school curriculum. When specialization occurs it is to be towards a group of allied occupations rather than towards a single one. In this proviso we see the emphasis on a broad suggestive approach.

We cannot enter into the details of the scheme presented so attractively in the report on the Education of the Adolescent. There is, however, one further point which connects easily with the next question which arises for consideration. It is suggested that the staple industry of a locality may form a convenient centre round which the instruction of the more specialized post primary schools is grouped. In this we see recognized the fact that the history and development of

industry has itself a cultural value, and that to the child whose work will fall inevitably within that industry, and whose aspirations are directed towards it, its study will form the most effective incentive towards constructive work. We are reminded of the Project Method, a well-known experiment in educational reform. There would seem to be no reason why this method should not form the instrument of instruction in the more practical of the types of post-primary schools. It is the natural parallel to the Dalton Scheme, which, in more academic subjects, throws the burden of investigation upon the individual child.

The Dalton Plan and the Project Method are peculiarly well suited to the educational needs of the young adolescent. He demands reality and individual expression. He may find both in the investigation of problems towards which his interest has already inclined him. They afford for him the 'play way' of education and yet provide him with the satisfaction of work achieved by his own efforts. They open up possibilities of co-operative enterprise and bring him into touch with the methods of industry and of research.

Education for Leisure.—"Finally", says the Report on the Education of the Adolescent, "we would urge the desirability of generating from the school studies interests which will continue through after life and will enlarge the opportunities for a fuller enjoyment of leisure. Among these we attach much importance to interest in those arts and crafts where practice demands only a relatively easy technique, but which provide boys and girls with a valuable means of self-expression and cultivate in them an appreciation

of simple beauty and sound workmanship in house fittings, dress and other things in common use. Several of our witnesses stated that one of the weak points in courses for older children at the present time was that pupils talked about things instead of doing them, and assimilated information without acquiring interests: it was said that this criticism applied specially to some of the science teaching. It was not sufficient, they argued, to read a number of books, unless the habit of reading for pleasure had been formed; it was not enough to teach scientific principles unless a scientific and critical interest in the world around was created. We think that if the teaching of elementary science with practical illustrations drawn from the pupil's environment could be closely linked up with the courses in handwork and drawing much might be done to create and foster interests that would continue through life. English literature also is clearly a subject of great importance from this point of view, and much indeed will have been effected if the pupils can be trained to appreciate good general literature, or, if they are interested in such subjects as gardening or engineering, to read publications bearing on them. Similar considerations apply to history, geography, music, physical exercises and games, which if taken on lines similar to those which we indicate in the following chapters, may arouse permanent interests in those pupils who have a natural aptitude and taste for any of these branches of the curriculum. We believe that teachers 'will be glad to do what they can to secure the further development of such interests by making known the means of continued cultural and vocational education, provided

in the locality for those who have left school and by urging their pupils to make use of them ' ' ' .¹

We have quoted this passage at length because it serves to emphasize the relationship of what is taught in school to life outside the walls of the school building. This relationship is a twofold one. On the one hand, it is expected that the instruction received in school will be of definite use to the individual child in his wage-earning capacity. But this, in the obvious sense, is true only to a limited extent. We have ceased to believe that instruction in a particular subject gives to the individual a mental facility which is taken over impartially into any branch of activity. We continue to believe however in the value of the branches of instruction with which we are familiarized in school, even though we inevitably forget much of the knowledge we received in connection with them. We value knowledge which opens up to us new lines of interest, and it is the hope of the school that such interests will persist and that some of them will be pursued further in leisure hours. So the 'circle of interests' or 'opportunities for complete living' or whatever features we have incorporated into our own statement of the educational aim will best be secured. By such means the school stretches out its influence into the wider life.

It is perhaps more satisfactory to consider the school as one of the constituents of the whole social community rather than as an isolated institution which yet contrives to make its influence felt in a wider sphere. We have spoken in an earlier chapter of the manner in which the groups within the school may

¹ *The Education of the Adolescent*, page 110.

reflect the characters of groups in the larger world. But the school aims also at bringing into itself the interest and contribution of the outside world. First and foremost, it endeavours to establish contact with the home, and to bring the parents into the school. Parents' associations and open days are familiar institutions in schools of all grades. They aim not only at interest and appreciation of the parents in what is done in the school, but also at their co-operation and help in preserving continuity between the traditions of the home and the school. We have spoken so often of the lasting effects of the early home environment that it is well to call attention to the other side of the picture. In the schools of the poorest neighbourhoods one finds evidence of interested co-operation of parents in the work of the school, and of sacrifice of time and money to secure the ideals for which it stands.

Parents, employers of industry, artists and musicians are invited to come within the school and to make their contributions to its welfare. The League of Nations, and the Red Cross Society, are only two out of many organizations which realize that in the school lies their most fruitful soil. We need only say that in this mutual interaction between school and society, while both will benefit, it is in the long run society which will benefit the more, when it is recruited from the children within the school. A well-known educator and sociologist once expressed himself on a public platform in these terms. " When people say to me that they are planning for the future I reply, ' The future is with us now attending His Majesty's elementary schools ' "

In conclusion we may allude to one other type of organization which has, as its acknowledged aim, the helping of those children who have met, in greater or less degree, with disaster in their efforts at adjustment to the social environment. The child guidance clinic is in this country still in an experimental stage, although already the unobtrusive work of pioneers has achieved notable results. In such clinics the skill of experts is placed unreservedly at the disposal of the individual child. Retardation in attainments as well as anomalies of character are diagnosed, analyzed and treated. Nor is their work entirely remedial. By thus diagnosing signs of trouble in their early stages they succeed in preventing more serious disturbance and secure to the child a happier and more useful life. Increased recognition of the value of these institutions should lead to a more extended use of the services they offer, and we may hope to see them an integral part of the educational system. The specialists of the clinics realize that their success depends upon the enlightened co-operation of the parents, the teachers, and the welfare workers. In this collaboration we may perhaps not unjustly see the prototype of the true educational instrument, in which knowledge and help from all branches of the community are given freely as the acknowledged right of the individual child. By such means the child will progress to his own maturity and will, in his turn, contribute to the common good.

REFERENCES

- Board of Education Report. The Education of the Adolescent.*
Board of Education. Suggestions to Teachers. Introduction
NUNN. *Education, its Data and First Principles*, Chapter XV.
THOMSON. *Instinct, Intelligence and Character*, Chapter XXIII.
TAWNEY. *From the Nursery School to the University.*
TAWNEY. *Secondary Education for all*
RUSSELL. *Education*, Chapters I-II, XIII, XIV, XV, XVI.

APPENDIX

THE INSTINCT CONTROVERSY

The problem of behaviour can be attacked from many different angles. While it is necessary to consider the divergencies which emerge from the study of various psychological theories, it is important that we shall bear in mind the fact that psychology is as yet a young science, and that the time in which conflicting views will be reconciled has not yet come. We are, in the meantime, entitled to seize upon any aspect which would appear of value in the attempt to build up a sound educational theory and practice, but we must beware of considering the psychological basis as ultimate and final.

The approach upon which emphasis was laid in the first part of this volume was that of considering an individual as composed essentially of receiving and reacting organs, and from this angle we considered the development of some aspects of the learning process. The peculiar value of this method of attack is, that in it nothing is assumed which cannot be verified by direct experimental evidence. No mysterious faculties are involved endowed with transcendental powers which will supply an easy explanation of that

which would otherwise be difficult to understand. Its defect would appear to be that it is inadequate to deal with certain elements which we believe to be fundamental components of human behaviour. As to how far this charge of inadequacy is correct we are not as yet in a position to decide.

There was also suggested the attitude which regards all life as essentially purposive activity continuous in kind between the lowest animals and the human being. The well-known experiment on the stentor has already been quoted in illustration of the thesis that even at this lowly stage of life behaviour is designed to show adaptation to produce the required result. All living things are able to act in such a way as to preserve themselves and the race, but in the case of human beings and the higher animals this activity is not fully developed at birth. We have elsewhere called attention to the very limited number of unlearned actions which can be evoked in the human infant by application of the appropriate stimulus. We see, in the case of many animals, a highly organized ability to secure certain ends, developed at a very early age. Such activities we describe as instinctive, and are wont to contrast them with the intelligence displayed by man. In the desire to preserve the essential continuity of all forms of life, recent psychology has laid emphasis on a similar instinctive activity in human beings. It is claimed that man also possesses a large repertoire of instincts, but that their appearance is spread over a period of a number of years, and that, except in a few cases, they are not as perfect, and therefore as circumscribed, as in the case of some of the lower animals. This vagueness

in form and delayed maturity is alleged as the basis on which training is built up. From this arises the greater power of man to adapt himself to and to overcome his environment. It is clear then that if the behaviour of man is to be brought into line with that of the insects the definition of an instinct must be modified to embrace his activities. Instinctive behaviour can no longer be regarded as perfect, and therefore unteachable. Text-books of psychology present a large number of such definitions and a corresponding wealth of classifications of instinctive activities. Some of these definitions and attendant classifications must be dealt with. The general line of demarcation is between those who recognize only a few broad directive activities, and those who increase the number of specific instincts, but at the same time prescribe the stimulus which evokes them.

The former school regards the individual as a centre of life-activity which groups itself round the two activities of self-assertion and of sex. Thus they see a group of ego and of sex-instincts, and, playing a smaller part, a herd instinct. Members of this school differ in the relative importance which they attach to the ego or to the sex group. In view of the very definite system of psychological treatment of nervous disorders, and theory of the general emotional equipment of the individual which has sprung from this attitude, the school of thought which embodies its expression cannot be regarded as a mere sub-division of the psychology of instincts.

Turning next to those psychologists who recognize a larger number of specific instincts, we find here also

a marked divergence of opinion. Four names may be mentioned here as typical of the points of view which are taken up in the controversy on instinctive activity. They are McDougal, Drever, Woodworth, and Watson. Of these the first two have much in common, the last Mr J. B. Watson attacks what he calls the instinct fallacy and opposes to it the behaviourist attitude, and Woodworth, while allowing the existence of instinctive activities, approaches more nearly to the attitude of scientific detachment which characterizes the behaviourist doctrine. The definition which McDougal has given of instinctive behaviour is of all such definitions the best known. He defines an instinct as "an innate disposition which determines the organism to perceive (to pay attention to) any object of a certain class, and to experience in its presence a certain emotional excitement and an impulse to action which find expression in a specific mode of behaviour in relation to that object".

His classification based on this definition is also well known. It includes fear, pugnacity, curiosity, self-assertion, self-abasement, parental impulse, gregariousness, hunting, acquisition, courtship, and repulsion. In accordance with his definition he claims that each of these activities is accompanied by a specific emotion, and that it appears spontaneously in response to the appropriate stimulus.

Drever's classification is more elaborate. He distinguishes first two main groups according as to whether the end sought refers merely to agreeableness or the reverse (these he calls appetitive), or whether it has reference to an object or situation (reactive). Each of these two groups is again divided under the

headings of general and specific. His complete classification is as follows—

| <i>Appetitive.</i> | | <i>Reactive.</i> | | |
|--------------------|-----------|--|---|-------------------------|
| General. | Specific. | General. | Simple. | Specific. Emotional. |
| Unpleasure | Hunger. | Play. Experi- mentation. Imitation. Sympathy. Suggestibility. | Prehension. Organ Adjustment. Locomotion. Vocalization. | Flight. |
| Avoidance. | Thirst. | | | Pugnacity. |
| Pleasure. | Rest. | | | Curiosity. |
| Seeking. | Exercise. | | | Self-Assertion. |
| | Sex. | | | Self-Abasement. |
| | Nausea. | | | Parental. |
| | | | | Gregariousness. |
| | | | | Hunting. |
| | | | | Acquisition. |
| | | | | Courtship. |
| | | | | Repulsion. |

A comparison of this list with that of McDougal shows that Drever's list of specific emotional reactive instincts coincides with McDougal's full list. His reactive general tendencies are comprised in McDougal's view as general innate tendencies which cannot be called true instincts because they lack a definite corresponding emotion. McDougal holds that the presence of a specific emotion is one of the essential criteria by which an instinct can be diagnosed. Drever maintains that the emotions as such are only aroused when the instinctive activity is curtailed. He holds that the stimulus to which the subject responds by instinctive activity is loaded with primary meaning and that the counterpart of this in the responding subject is instinct feeling. As opposed to the simple and unanalyzable, primary meaning and instinct feeling, are the secondary meaning and true emotion which result when the working out of the instinctive activity is interfered with. It would appear that to Dr Drever the primary meaning is associated with some innate disposition independent of the individual's

first experimental contact with it. It is the same question which occurs in reference to the number and complexity of innate reaction patterns. The question is a controversial one—does the admission of instincts involve also the admission of Drever's postulate of primary meaning?

The question of emotion has also been raised. No subject in the field of psychology is fraught with such danger in its discussion as that of emotion. We may feel tempted to say that, whatever emotion may be, it is bound up indissolubly with instinct activity wherever that may manifest itself.

So far we have simply enumerated two rival lists of instincts and have indicated one or two of the chief subjects of controversy which they suggest. The teacher may well feel that this is not his peculiar province and that what really concerns him is not the classification of instincts, but their significance in his work. The conception of instinct which we have outlined has been welcomed by educational psychologists and on it a system of educational theory and practice has been built up. Much of the value of this system will remain unchanged whatever may be the ultimate decision as to the number grouping and hierarchy of the primitive instincts. There is, however, one point which we must emphasise, for on this rests the necessity, as we see it, to indicate now the various aspects of the instinct controversy. It is hoped that the young teacher will find interest and leisure to pursue the future developments of the science of psychology. This can only be done with profit if it is approached with an open mind. A wider reading of the subject can only bring confusion to one who

approaches it on the assumption that his first rudimentary knowledge is fixed and incontrovertible. More particularly will this confusion ensue in connection with the treatment of instinct and emotion. It is well that at this point we should bear in mind the warning of Sir Percy Nunn that the organism comes before the instincts, which are only to be looked upon as local differentiations of a general life-activity.

We may now turn to two other views on instinct. Woodworth defines an instinct as a persisting tendency set up by a stimulus towards a result which cannot immediately be accomplished. That is to say it differs from a reflex action in that it is a delayed response. The individual, because of his internal state, tends towards a line of action. The concept of delay, while it may appear to contradict the more familiar spontaneity which we are accustomed to think of as inseparable from instinctive activity, is yet a helpful one, and may be related to Drever's conception of emotion as the accompaniment of curtailed instinctive activity. Woodworth classifies instincts into three main groups, each of which is sub-divided into a number of specific instincts. His classification may be tabulated as follows—

A. Responses to organic needs.

- (a) hunger
- (b) breathing
- (c) heat and cold
- (d) shrinking from injury
- (e) fatigue

B. Responses to other people.

- (a) gregariousness

- (b) mating
- (c) fighting
- (d) self-assertion

C. Play.

- (a) playful activities
- (b) locomotion
- (c) vocalization
- (d) curiosity and laughter
- (e) manipulation
- (f) exploration
- (g) fighting
- (h) self-assertion
- (i) submission.

It is not necessary to compare this list item by item with the ones given above. Two points of comparison may, however, be made. The first is that the criterion of specific emotion would not be applicable to the whole of Woodworth's list, the second that he allows no distinction in kind between the instinct proper and an activity such as breathing which we have hitherto considered as a pure reflex.

The attitude of Woodworth towards the question of instincts may be considered as half-way between that of McDougal and of the behaviourist. We may then complete this preliminary investigation by reference to the views of Watson, who represents the behaviourist school of thought. Watson's general view would appear to be that the conception of instinct must inevitably be very much more circumscribed if not altogether eliminated. In 1923 in his book, *Psychology from the Standpoint of a Behaviourist*, he defined an instinct as a series of congenital responses

unfolding serially under appropriate stimulus, and again as an hereditary pattern reaction of which the separate elements are movements of the striped muscles. In the latter part of the definition he wishes to convey that in instinctive behaviour the action is explicit and localized, whereas in emotional activities, which are also based on hereditary pattern reactions, the radius of activity lies within the individual organism.

There is a further point made by Watson which should do much to resolve the confusion into which we are liable to fall in trying to understand the full implications of the theories of instinctive action. It may be briefly stated thus. While there may be a large repertoire of unlearned actions, the fact which is undisputed that they do not all appear fully fledged soon after birth means that by the time they come into operation the individual has acquired a large number of habits which must inevitably affect the manifestation of the activities. We must then be content to see in the activities even of very young children a combination of instinct and habit. With this proviso, which does not in the least take away from the value of instinctive activity, much confusion will disappear and we shall be able to concentrate upon those aspects which from the point of view of the educator are most important. The question for example of how soon instinctive activities can be overlaid by the habits demanded by the social environment is a fundamental one.

For the practical teacher the important point is that he shall recognize the primary importance of certain forms of activity and the part which they play in the organization of learning and of character.

We have in the foregoing pages indicated the broad lines along which such development takes place. For the rest, he, the teacher, must preserve an open mind in the face of controversial topics, but he would be well advised to refrain from indiscriminate use of the term 'instinctive' in reference to activities which are in reality the complex product of many acquired constituents.

INDEX

- Abstraction, 138-140
- Ach, 246
- Achievement Quotient, 163
- Acquisitiveness, 236, 238, 239
- Adams, 14
- Adjectives (child's first use of), 84
- Adolescence, 217, 228, 252, 258, 259-269
- Adrenal Glands, 50
- Aesthetic Imagination, 104
- Anger, 25, 32, 199-203, 249
- Animal Learning, 60-62, 65-67
- Apperception, 13, 91
- Arithmetic, 20, 87-89, 101, 137-138, 164-167, 172, 222, 232
- Attainments
 - Standard, 161
 - Tests of, 163-176
- Autonomic Nervous System, 56

- Backwardness, 168-174
- Ballard, 120, 168
- Binet, 146, 148, 149, 158, 163
- Board of Education, 255
- Brain, 53 *et seq.*
- Burt, 134, 140, 148-160, 166-171, 174, 208, 242-253

- Cerebellum, 53
- Cerebrum, 53 *et seq.*
- Change of school at 11, 262 *et seq.*
- Character, 193 *et seq.*
- Class, 224
- Comenius, 77
- Competition, 63, 202, 224, 232
- Complexes, 208, 217-220, 227, 248, 251

- Concept, 83, 84
- Conditioning, 23, 25, 35, 37, 42, 66, 195
- Conflict, 38, 43
- Construction, 236
- Co-operation, 224, 231
- Co-ordination, 39-41, 68-69
- Correlate, 134
- Cretinism, 50
- Curiosity, 236, 238
- Curriculum, 7, 15, 64, 65, 85-86

- Dalton Plan, 265
- Discipline, 176-192, 196, 218, 242
- Disposition, 241
- Drever, 104, 130, 273-276
- Drummond, 43

- Ebbinghaus, 120
- Edgell, 131, 142
- Elementary School, 257 *et seq.*
- Emotions, 30-33, 56, 193-207, 209, 242
- Endocrine Glands, 49-56, 245
- Engram, 112
- Experimental Schools, 6, 17, 234
- Exteroceptors, 47, 81

- Fear, 32, 43, 136, 195-199, 251
- Forsyth, 36, 39, 41
- Fox, 89, 91-92
- Free Discipline, 187-191, 228
- Freedom, 17
- Freud, 204, 208, 230

- Galen, 243
 Galton, 95
 Games, 202-203
 Generalized Reactions, 83-85
 Geography, 71, 90, 234
 Gregarious Instinct, 221
 Group Activity, 216, 221-228
 Group Tests of Intelligence, 156

 Habit, 28, 44, 52
 Houses in School, 224
 Hume, 171

 Illustrations—use of, 91
 Imagery, 94-101
 After image, 94
 Definition, 95-97
 Children's Imagery, 95-97
 Value of Imagery, 97-101
 Imagination, 101-108
 Reproductive, 104
 Aesthetic and Pragmatic, 104
 in children, 105
 relation to sense experience, 106
 Make Believe, 108
 Imitation, 184
 Incentive, 63
 Individuality, 14, 15
 Instincts, 270-279
 Intelligence, 145-160
 Definitions, 146
 Criterion of, 147
 Central Factor "g", 147
 Tests—individual, 148-151
 Quotient, 148
 Mental Age, 151
 Age Limits of Development, 152
 Constancy of I.Q., 153
 Group Tests, 153-156
 Performance Tests, 156
 Diagnostic Value of Tests, 157
 Significance of Intelligence Quotients, 157-159
 Interest, 13 *et seq.*
 Interoceptors, 48
 Isaacs, 188, 229, 231, 237
 Jealousy, 204

 Kinaesthetic Receptors, 47
 Kinaesthetic Responses, 78
 Koffka, 144
 Köhler, 129, 143-144

 Leaders, 226 *et seq.*
 Learning, 59 *et seq.*
 Continuity in, 59, 76
 Animal Learning, 60, 61
 Criterion of, 60
 Laws of, 62
 Incentives to, 62, 63, 64
 Parallels between human and animal, 65
 Elimination of useless responses, 68
 Effective Units, 69-72
 Plateaux, 72-74
 Leary, 74
 Leisure, 265
 Locke, 197
 Love, 32, 203-207
 Lying, 251

 Mason, 167
 Maxims of Method, 11 *et seq.*
 McDougall, 206, 212, 214, 227, 241, 273-277
 Memory, 111-127
 innate retentiveness, 116
 memorizing, 116-118
 experimental research, 118-127
 reminiscence and obliviscence, 119-122
 units, 122-125
 value of reproduction, 124
 intervals of practice, 125
 Mental Age, 151
 Montessori, 40, 77, 157, 189, 231, 247, 256
 Motives, 209, 240
 Muscular Memory, 78

 Nervous System, 50-57
 Nervous Temperament, 24
 Northumberland Tests, 154-156
 Nunn, 15, 60, 77, 109, 130, 178, 181, 185, 214, 231, 239, 249, 259
 Nursery Schools, 256

- Parasympathetic Nervous System, 56
 Perception, 79 *et seq.*
 Personality, 240
 Pestalozzi, 77
 Phantasy, 108, 231
 Physiological Limit, 72-74
 Pituitary Glands, 50, 245
 Plateaux in Learning, 72-74
 Play, 228 *et seq.*
 Play-Way, 142, 233
 Preperception, 90, 117
 Project Method, 234, 265
 Proprioceptors, 47
 Punishment, 186, 197
- Reading, 70, 73, 89, 164, 166, 171
 Reasoning, 128 *et seq.*
 definitions, 129-130
 elements of, 130-133
 examples, 133-136
 at perceptual level, 136
 generalizations, 136
 abstraction, 138-140
 Köhler's Experiments, 143-144
 Receptors, 46 *et seq.*
 Records of Progress, 63
 Reflex, 38, 276
 Relationships, 67, 130-136, 140
 Reminiscence and Obliviscence, 119-122
 Repression, 218
 Response Organs, 49 *et seq.*
 Rewards and Punishments, 64
 Rhythm, 235
 Rousseau, 18
 Rusk, 100, 106
 Russell, 187, 198, 202, 223, 232, 239, 257
- Schema, 83, 87
 Scientific Method, 18, 19
 School Life
 in nursery schools, 256
 in elementary schools, 257
 after 11, 262
 School and Society, 267
- Sequin, 157
 Self Assertion and Self-submission, 227, 250
 Self-consciousness of, 37, 39
 Self-government, 187-191, 228
 Self-regarding sentiment, 213, 227
 Sensation, 81, 251
 Sense Experience, 38 *et seq.*
 Sense Organs, 46 *et seq.*
 Sense Perception, 79 *et seq.*
 Sense Training, 77 *et seq.*
 Sentiments, 131, 203-208
 Sex Education, 219
 Sex Offences, 252
 Shand, 212
 Spearman, 85, 114, 147, 152, 174
 Speech, 41, 80, 84
 Stealing, 249
 Stimulus Response, 21 *et seq.*
 Sturt and Oakden, 180
 Sublimation, 25, 195, 199, 253
 Substitute Stimulus and Response, 24, 61, 248
 Suggestion, 184-185, 216, 222, 250
 Supplementation of Perception, 82, 94
 Suprarenal Glands, 245
 Sympathetic Nervous System, 56, 245
- Teams, 224
 Temperament, 241 *et seq.*
 Terman, 150, 152
 Tests
 of Intelligence, 148 *et seq.*
 of Attainments, 161 *et seq.*
 Thomson, 73, 99, 133, 154, 161
 Thorndike, 62
 Thyroid Gland, 50, 245
 Tradition, 216
- Unconscious Mind, 218
 Unlearned Reactions, 22 *et seq.*, 271

- Vegetative Nervous System, 51,
55
Vital Functions, 35
Ward and Roscoe, 71, 178, 179,
192
Watson, 23, 28, 32, 33, 34, 42,
80, 195, 203, 273, 277, 278
Wheeler, 173
Will, 246
Woodworth, 63, 66, 72, 81, 116,
118, 126, 130, 135, 146, 197,
221, 240, 273, 276
Writing, 73